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COTTON

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"COTTON" ENCIRCLING THE WORLD.

Our readers will be interested to know that an arrangement has been made between the European and American editions of COTTON, whereby each becomes the representative of the other. Through the medium of the two the world's greatest single industry, both in point of capital invested and operatives employed, is covered.

The European edition of COTTON, published in Manchester, England, each week, is the official organ of the Manchester Cotton Association, the membership of which represents two-fifths of Great Britain's spindles, a number nearly equal to the total of that running in the United States. Outside of Great Britain, the European edition of COTTON reaches a large proportion of the spinners of continental Europe, India, China, Japan and Latin America. It contains the latest, best arranged and most reliable information relating to the cotton industry. Most of the principal textile machinists of England advertise in its columns. Its statistics are thoroughly trustworthy, under the able editorship of Richard J. Allen who has had a very lengthened experience in the raw cotton trade. He began his apprenticeship in the Liverpool cotton market in Feb. 1877, and remained there until March, 1895, when he went to Manchester as the first secretary of the Manchester Cotton Association. Altogether his experiences in the raw cotton markets cover a period of some thirty years. As well as his duties as secretary, he has been the editor since its inception in April, 1895, of the official organ of the Association called COTTON, which reaches the great majority of cotton men throughout the world. He is a fellow of the Royal Statistical Society (London); a fellow of the Chartered Institute of Secretaries (London); and an Associate of the London Association of Accountants (London). He holds the military rank of major in the English Military Auxiliaries with which he has been actively associated some twenty years.

All communications from America for the European edition should be addressed to the Cotton Publishing Co., Prudential Building, Atlanta, Ga.

The American edition of COTTON occupies a field exclusively to itself, in its relation to cotton manufacturing in all of its branches, from the raw material to the finished product, as viewed in both its economical and technical phases, and is received in nearly all of the cotton mills in this country.

SPINNING COTTON WASTE.

In this issue may be found the first of a series of articles on "Cotton Waste Spinning," written by a textile engineer well known in Great Britain and continental Europe, that should receive the careful perusal of cotton manufacturers, as touching upon a subject that is vitally connected with economical manufacturing, especially in its relation to the problem of how to best utilize the waste that is produced in mills.

The author of this series relates what is being done by manufacturers abroad, which should profoundly impress our

own manufacturers as to the best methods for the disposition of mill waste. We believe that much instruction can be derived from it, especially of practical use to Southern cotton manufacturing, where coarse numbers are desired to be spun, not only from factory waste, but from the large bulk of low grade cotton that was made last year.

If all the waste made in the cotton mills of the United States were reworked and spun into No. 8 yarn, it would keep one million spindles employed fifty-two weeks in the year. It may seem strange to those who are not familiar with the fact that seven-eighths of the cotton sold in the United States is reworked by New England mills, at an average cost of about 5 cents a pound. The South uses comparatively little of the waste made in mills other than where produced. The economy of this is a doubtful equation, especially for mills that make medium and above counts of yarn, for which waste other than that made in the picking department is reworked.

About 25 per cent of the waste made in our domestic cotton mills is sold to mills other than those where it is made. Ten to 15 per cent of our mill waste is exported to Europe, chiefly to the continental mills. This is, in a measure, a reflection upon the skill of our manufacturers that they should be willing to see their waste, even as low as floor sweepings, cop and bobbin yarn waste, bought by foreign mills and converted into salable goods at a profit, such as flannelettes, blankets, crashes, and even drills and sheetings.

For mills making numbers above 10's, we believe that those who have considered the subject are of the opinion that all kinds of waste made beyond the finisher lapper from regular work, as card waste, drawing and roving waste, should not be undertaken, but sold to those who spin the coarser grades of yarn, or for other purposes, if good uniform yarn is to be expected.

The spinning of waste is an industry by itself, requiring just as much skill, from the superintendent down to the most menial labor, as that required for a higher class of manufacture. We believe that there is here a profitable field to exploit both for the manufacturer and the machine builder. One thing in particular should be avoided, and that is the idea that inferior or second-hand machinery will answer all purposes for the manufacture of waste. On the other hand, if there is any branch of cotton manufacturing requiring good and efficient machinery, it is in the utilization of this inferior and low cost material. As a rule we should say that yarn made from waste should be for filling; the warp of any fabric to be composed of good yarn made from new stock.

FINE SPINNING REQUIRES LESS LABOR THAN COARSE SPINNING.

There have been more or less elaborate quotations from the census report on cotton manufactures, which made its appearance not long since, and among them is the following, to which we desire to call attention for the purpose of correcting an error of expression on the part of the author of the report, which says that, "The figures for the Southern States, comparing years of full occupation and prosperity, teach something. A general increase from 44.09 spindles to a single operative in 1900 to 62.52 spindles in 1905, indicate a remarkable increase in the efficiency of the labor employed. . . . *Inasmuch as fine spinning requires more labor for each spindle,* the difference would be larger if that consideration were taken into account."

The author has stated in the phrase italicized what he did not intend to say as evidenced by the context, but so long as the statement has been made we desire to correct it to the extent that fine spinning requires *less* labor for each spindle, and not *more,* which will be understood by the practical manufacturer. To illustrate, we will take two examples from mill records of what is actually produced on spinning frames making coarse and fine numbers, premising what we have to say with the statement that the production of a frame is not necessarily limited by the spindle speed, that is, the spindle can go faster, if other things permit, and the traveller can also go faster, but if the front roll on the fine work should run as fast as the front roll on the coarse work, the roving ends would come down or break.

On a frame running on 65's warp yarn, the front roll (1-inch diameter) runs 85 revolutions per minute, while on 14's warp yarn the front roll runs 140 revolutions per minute. In these instances the speed of the spindle for 65's is 9,600, and that of the 14's is 8,200. On the finer yarn the spinner can run 1,200 spindles and on the coarser yarn only 684 spindles, showing that nearly twice as many spindles can be operated by one spinner on fine yarn than on coarse yarn.

According to another mill record operating on 36's and 9's, the speed of the spindle in the first instance is 9,000 revolutions per minute, and that of the front roll 117 revolutions, producing 350 inches of yarn per minute, while in the second instance the speed of the spindle is 7,300 revolutions per minute, that of the front roll 171 revolutions, producing 513 inches of yarn. Thus it will be seen that the spinner on the coarser yarn has to handle much more roving than the one on the finer yarn, and to offset this the fine spinner is given about one-third to nearly one-half more spindles to tend.

BUSINESS CONFIDENCE IS WANTED.

There is always a disposition on the part of the people to draw analogies between conditions that exist at one time with those that have existed at some previous time, and today this tendency is no different from what it has been heretofore, and a favorite comparison is that between the conditions prevailing today with those that brought about the panic of 1893.

It should not be forgotten, though, that however similar these two periods of depression may appear, they are not due to related causes. The only comparison that can be justified is that the respective depressions were precipitous and broke into times of business tranquility and confidence; but it should be borne in mind that in 1893-4 the foreign and domestic demand for agricultural and manufactured goods had become abnormally restricted, and agriculture in particular was in a bad situation, while there was a visible overproduction of manufactured products necessitating the disposition of these at a loss to the producer.

Today the country's industrial conditions are entirely different, fundamentally and superficially, and not only does this apply to the United States but to Europe. The finances of the country have of late been shocked, but they are in a rapid state of recuperation, and will soon regain their healthy and normal position, if sane and conservative management governs our financial and commercial affairs.

The industrial enterprises and schemes of the world may have been developing too rapidly of late years, until there has been more or less suffering from the exhaustion of an insufficiency of capital or buying power to absorb the constant emissions of new securities put out by governments, municipalities and corporations. The vast aomunt of money that has been required to absorb these, and to meet the obligations incurred, may be appreciated when it is stated that in the United States alone the increase in the circulation of money since 1892 has been from one billion, six hundred million dollars to nearly two billion, nine hundred million dollars. This in itself will exhibit the immense progress that has been made during this period of fifteen years, and the enormous requirements to meet the rapid evolution of the industry and commerce of this country.

All that is required to change the present complexion of the financial situation is a restoration of confidence on the part of the people, banking institutions and those engaged in trade and commerce. There is as much money in the country today, and in fact more, due to recent importations, than there was before the Wall Street flurry, and all that is necessary is the simple remedy of confidence on the part of everybody.

The recent decision of the Treasury Department at Washington to issue $50,000,000 of Panama Canal bonds, and $100,000,000 of 3 per cent certificates, adds nothing to the amount of money in the country, but will have the effect of drawing what there already exists into circulation, where it properly belongs, with the immediate object of relieving the tension and stringency in the money market, and restoring confidence in trade, and enabling the West and South to move their immense agricultural crops into the channels of commerce.

WELFARE WORK IN TEXTILE MILL COMMUNITIES.

There is much more attention given today to the amelioration of the conditions of employees in textile mills than ever before, both in the North and in the South, as a business policy in harmony with humanitarian instincts. There is among many a mistaken notion that employers in the South are indifferent to the welfare of their employees, and that their relations with the latter are apathetic. That it is good business policy to have employees surrounded by things that are elevating is thoroughly recognized by those who have studied the subject, and have looked at it from a proper altruistic point of view. Where this attention is not given to improving the environments of mill operatives, it is noticeable that the class of help is comparatively inferior to that which is to be seen in factories where consideration is given to their moral and physical improvement.

There is a disposition on the part of young people to keep away from factory employment, because of its unattractive associations, notwithstanding wages may be more remunerative than those received in other vocations. It, therefore, becomes a matter of wise administration on the part of the mill management to see that the interior and exterior of the factory are made attractive to employees, and that the home surroundings are made inviting, in conformity with the best notions of home life, conducive to higher moral and intellectual culture.

Among the first improvements in this direction is proper attention to the sanitary arrangements in the factory, including cleanliness about the machinery and in the work, under physical conditions that will be stimulating to this end.

In carrying out any welfare scheme, it is quite important that the management should fully comprehend the peculiarities, if not the idiosyncrasies of those in its employ. Every manufacturing concern has to meet the requirements of welfare work in a different way to conform to existing conditions, affected by the class of help employed, whether it be native or foreign, each of which has its own peculiar ideas of living and pleasures, though, of course, it is incumbent upon the authorities to institute methods of living and pleasurable pursuits on a plane consistent with the most advanced ideas of social improvement. A community of Poles, Armenians, or Italians requires an entirely different treatment from one composed of native Americans or those from Great Britain, or Germany; therefore, much, if not everything, depends upon local circumstances.

It is a mistake to give employees advantages too quickly in advance of their appreciation. The work should be one of development and introduced slowly, a little each year, and its growth should be consistent with that of the business of the manufacturing establishment. In fact, the guiding spirit should be one along lines of natural development induced by the wants of those who are to directly enjoy the benefits, though these latter should be made apparent and demonstrated by living examples that can be easily put into execution.

All welfare work should be thoroughly and consistently planned for future wants far beyond immediate conditions, and brought to the standard by gradual processes, with the details developed according to the desires and appreciation of the work people. Some of the schemes for improving the conditions of operatives have been launched too soon, with the result that disappointments or failures have been the outcome. No plan can safely be promulgated in its complete form and be successful. Rather it should be introduced step by step, as the employees are fit to receive it.

There is no necessity for any manufacturing concern to have scattered about its property such things as old tin cans, rags, bottles, and other unsightly materials. It costs little or nothing to see that the premises are kept free from such things, and the slight cost is more than returned by a better class of contented help. Yet it is not infrequently seen that mill surroundings are made unattractive by the presence of such materials as these, without a thought being apparently given to the detrimental effect that the sight of such conditions has upon those who see them in its influence upon home living and environments, which become more or less reflected in one's character, which is also evidenced in the quality of the work performed in the mill. A person of refined tastes, as cultivated by his environments, both at home and in the factory, is sure to make a better employee in every respect, both in the quantity and quality of his work. No one that has not experienced it has any idea of the good effect that proper surroundings have upon operatives in their daily vocation, as contributory to the benefits derived by the employer. It is not money thrown away, but well invested, to have about the mill good roads, macadamized it may be, clean walks, well kept lawns and shrubbery, and even vines growing over the walls of the factory, making the whole attractive to the eye, and having an elevating effect upon the mind.

The mill is a good place to start at in furnishing examples of proper living conditions, and of how things should be kept to become attractive. With the employees seeing these during their daily labors they become in time educated to the pleasure of fixing up their home surroundings both in their houses and about their own grounds, which are more likely to be kept with good walks, and lawns carefully trimmed.

One of the first things that the mill should see to is proper light and ventilation, as dark rooms have not only a depressing effect upon the operatives, but are frequently the cause of many accidents. It admits of little discussion that light and sunshine contribute greatly to the cheer, as well as to the health of the help. Care, however, should always be taken that in the lighting of mills by ribbed glass, for instance, the rays of light shall be so diffused that all glare shall be eliminated as much as possible to prevent headaches or shadows that might interfere with the good quality of the work performed. A system of ventilation should be installed that will give to the operatives a frequent change of air, not only for their own health, but for the mill's good in having a more efficient class of workers.

The foundation of all good welfare work is that of teaching people how to live even better than that to which they may have been accustomed, and any scheme should be one of gradual development that comes within the ready comprehension of those for whom it is planned, and of which they will naturally become a part, without their feeling that whatever is done is in the nature of paternalism contrary to any spirit of independence or freedom of action. Every employee should feel that what is being done for him is largely of his own making, in which he takes a more or less active part. Schemes should be developed more in line with the expressed desires of those who are to be benefited than with any arbitrary plans of the employer. For example, the character of a library for the intellectual improvement of the employees should be one that will fit in with the educational advantages and wants of those who are to be benefited by it, and it would be better to have the reading material consist of comic papers, of a good order, of course, than to place before its patrons standard novels of a high character, if these latter are not wanted, and, therefere, remain unread.

MILL HOURS IN 1853.

Fourteen-Hour Day in Massachusetts.—Mill Managers Bitterly Opposed a Reduction to Ten Hours.

The timetable adopted by all the big mills in Lowell, Mass., in September, 1853, provided for an average workday of 11 hours. That was considered a very great concession to the employees, because prior to that time the regular schedule called for 14 hours labor per day.

Prior to 1853 all the employees in the mills had to be in the mills and begin working at 5 o'clock in the morning. At 7 o'clock the bell rang and the hands had a half hour for breakfast, and during that time they were obliged to eat and be back at their looms or other duties ready to proceed with the day's labor.

At 12 o'clock the hands had three-quarters of an hour for dinner and coming in again at 12:45 o'clock they worked steadily until 7 in the evening, when they were dismissed for the day, and had a chance to get their suppers.

In 1853 Benjamin F. Butler was elected to the legislature for the first time, and he introduced a bill making 10 hours a day the legal time for employees of the mills. The managers of the mills bitterly opposed this legislation, and in the end the bill failed, because a compromise was arranged and in a spirit of what they considered great liberality the mill management offered a schedule which called for an average of 11 hours a day, taken the year round. This schedule, read, in part, as follows:

Timetable of the Lowell mills, arranged to make the working time throughout the year average 11 hours per day, to take effect September 21, 1853. From March 20 to Sept. 19, inclusive, commence work at 6:30 a. m. Leave off work at 6:30 p. m., except on Saturday evenings. Breakfast at 6 a. m. Dinner at 12 m. Commence work after dinner at 12:45 p. m., and from Sept. 20 to March 19, inclusive, commence work at 7 a. m. and leave off work at 7 p. m., except on Saturday evenings.

From March 20 to September 19, inclusive, the factory bell rang first at 4:30 in the morning to wake the hands up; it rang again at 5:30 to warn them it was time for breakfast, and at 6:20 it rang the signal for beginning work, and employees who were not then in the mills and ready to begin the day's labor were shut out.

The schedule of quitting time was carefully regulated, the company seeing to it that it got all that was coming to it in the way of work. The schedule of quitting time on Saturdays for December, for example, was made up as follows: First Saturday, ring out at 3:50 o'clock, second Saturday 3:55 and on the fourth and fifth Saturdays, at 4 o'clock.

COTTON GROWING IN THE SOCIETY ISLANDS.

The growing of long-staple cotton was introduced into Tahiti soon after the end of the Civil War in the United States, when unusually high prices were paid for cotton. Up to 1885 the average quantity produced here annually was 1,070,631 pounds, but from that year until 1900 the average was reduced to 355,384 pounds, and then for several years the production was almost nothing. Owing to the advance in the price of cotton attention has again been directed to the growing of this staple. In 1905 the president of the Papeete Chamber of Commerce made an experiment with Sea Island cotton seed obtained from the United States Department of Agriculture. On less than three acres he produced 2,400 pounds of lint cotton, which was sold at a net profit of 30 per cent., but owing to his losses during the cyclone in February, 1906, he has not been able to grow cotton since 1905.

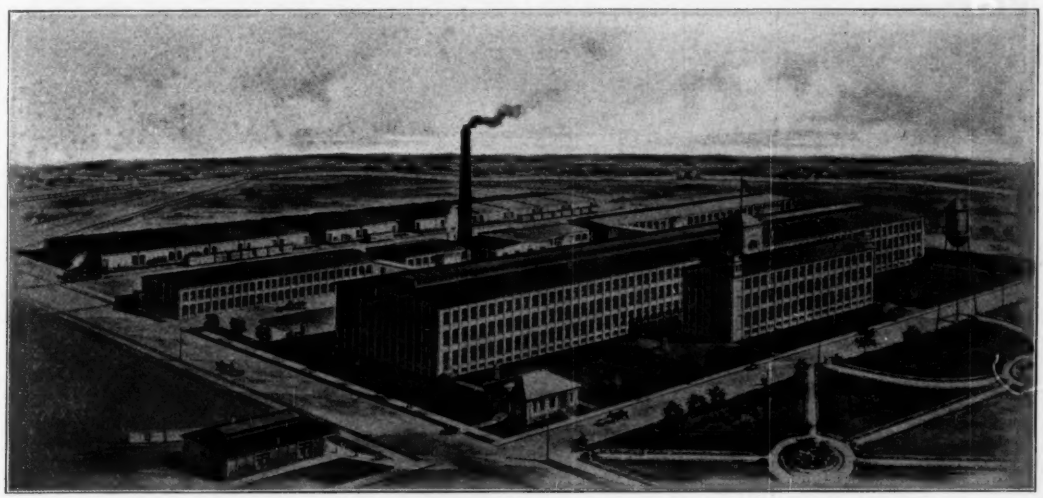
If an unmercerized cotton fiber be treated with cuprammonium, and then washed and dyed, with a substantive dyestuff, those places from which the cuticle has broken away are intensely colored, whilst those parts which are still protected by the cuticle are only slightly stained.

It would appear that the cuticle and the protoplasmic wall of the lumen, besides possessing a mordanting property towards basic dyestuffs, and which, being penetrated by these dyestuffs only with difficulty, hinder the access of the color to the cellulose between them.

American Textile Company's Cotton Mill, Atco, Ga.

The American Textile Company's mill is located in the village of Atco, Ga., two miles from the center of Cartersville, an enterprising town of about 5,000 inhabitants, 48 miles northwest of Atlanta, on the Western & Atlantic Railroad. The mill village is the property of the company, and is connected with the business part of Cartersville by good roads. The name Atco is derived from the initials forming the name of the company, so that the American Textile Company easily becomes "Atco," for general as well as for commercial purposes.

Some 25 years ago, E. L. McClain, of Greenfield, Ohio, inaugurated what has since become a large and very successful business for the manufacture of articles embodying his patents, principally pads for horse collars, for which there



THE AMERICAN TEXTILE CO'S PLANT, ATCO, BARTOW CO., GA.

are required large quantities of cotton drills, for the manufacture of which plans were made for erecting and operating a cotton mill in some Southern State; and in carrying out this scheme Mr. McClain had associated with him his brother-in-law, W. M. McCafferty, also of Ohio, but now the manager of the American Textile Company. A suitable location for the establishment was found where it is now situated. In May, 1903, the erection of the mill was begun, and it was completed and operations started in 1905. When the plans for the plant and village are completed there will be involved an investment of over $1,500,000.

The railroad connections with the mill and transportation facilities are excellent, a spur track running into the yard for the delivery of cotton from the cars onto the warehouse platform, and the delivery of the finished goods into the cars for shipment. This arrangement is complete, as the raw material and manufactured products are received and delivered, respectively, at near the same point.

The accompanying illustration of the factory and surroundings is no fancy, but true to what actually exists, except the main building is now only one-half in length of what is planned, as shown. The buildings are of brick, the main edifice being three stories high with a basement, 320 feet long, as it now stands, and 130 feet wide. When completed, according to plans, this building will be 640 feet long. The top, or third, floor has a monitor roof, and is devoted to spinning. The second floor is given to carding, the first floor to weaving, while the cloth and dyeing departments are in a separate building.

Every part of the mill, exterior and interior, exhibits perfection of neatness, very little waste being made, and what is, is collected and placed in proper receptacles. The rooms are lighted by ribbed glass in the windows, giving a diffused and clear light, even in the middle portion of the rooms, as noted in the illustrations of the card room and weave room.

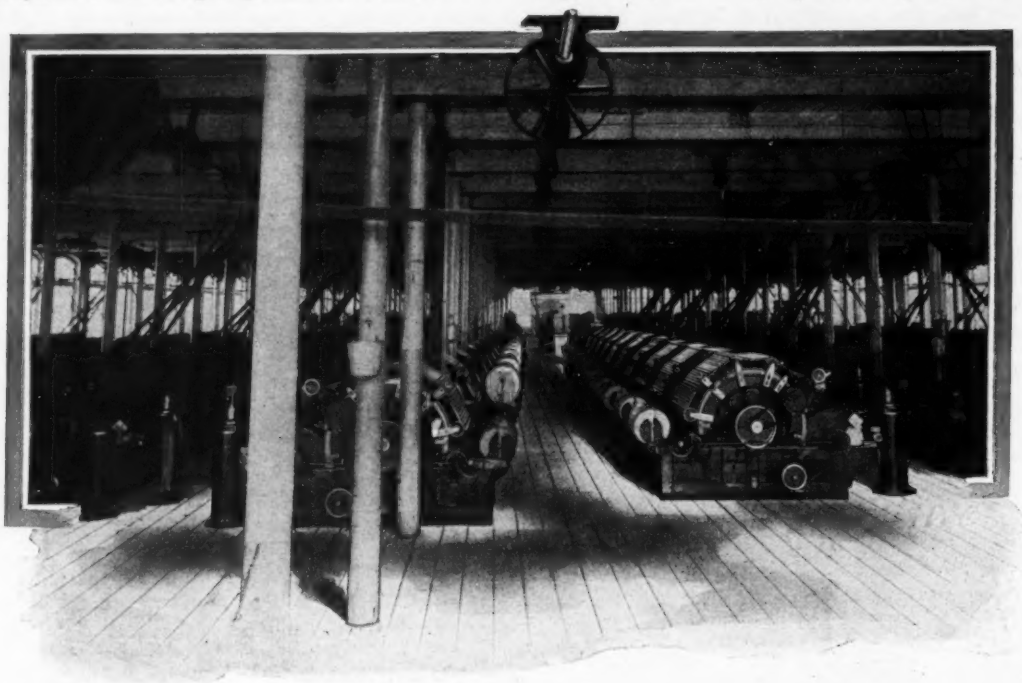
The mill has now 35,000 spindles in active operation, along with 802 looms. The entire plant is run by steam, and is equipped with an electric lighting system. The smoke-stack is constructed of brick, and is 175 feet high. The steam plant consists of twin, tandem, compound Corliss engines, nominally rated at 2,000 horsepower, but capable of producing 2,500 to 2,800 horsepower, of ample capacity for the second end of the mill. The engines were made by the Robert Wetherill & Company, Chester, Pa. The boilers were made by the Walsh & Weidner Boiler Company, Chattanooga, Tenn., and are arranged in one battery of seven boilers, for the present need of the factory, with provision for another battery of equal capacity to be installed when the factory is fully completed. The power is transmitted from the engine to the different floors by ropes running in a central tower. The ropes were furnished by the American Manufacturing Company, New York. The machinery is mechanically driven with leather belts furnished by the Page Belting Company, Concord, New Hampshire.

The warehouses, seen in the distance in the picture of the mills, are constructed of brick, and are fire proof in every particular, with brick partition walls extending above the roof, and laterally beyond the sides of the buildings,

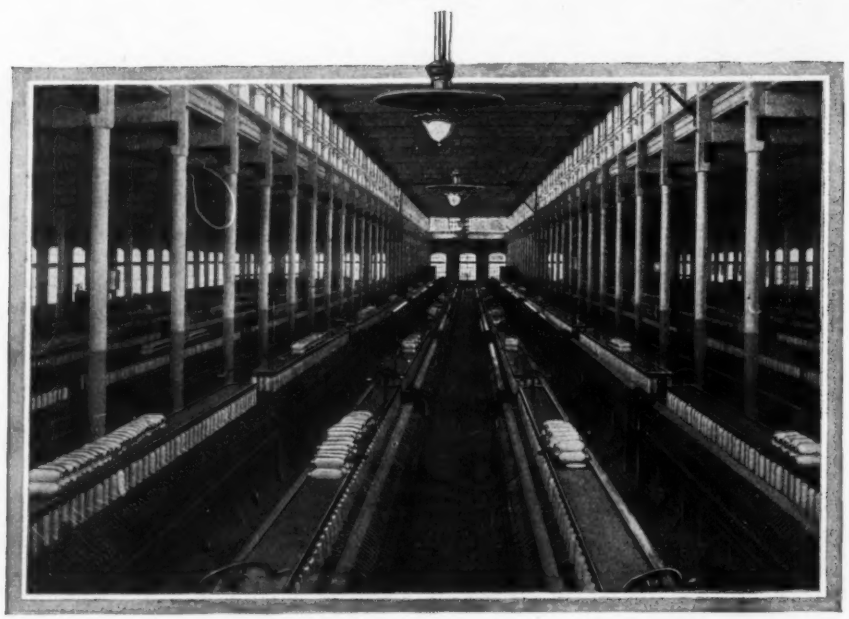
which consist of one story and basement, all provided with sprinklers for the extinguishing of any incipient fire. The same system of sprinklers extends throughout all parts of the factory.

The system of electric lighting consists of a most modern installation, made by the General Electric Company, Schenectady, N. Y., a notable feature of which is the diffusion of light without casting a shadow. (See arrangement of the overhead lights in the illustration of the spinning room.)

The picking machinery is located in the building seen in front of the main building, with rooms sufficiently large to answer the wants of the completed establishment. The openers and lappers were made by the Kitson Machine Shop, Lowell, Mass. The openers are placed on the first floor, the cotton being carried by conveyors to the lappers or pickers located on the second floor.



CARD ROOM



SPINNING ROOM

The card room has 82 revolving flat cards, made by the Lowell Machine Shop, Lowell, Mass., which concern also furnished the drawing frames, roving frames, spinning

frames, slashers and warpers, through John A. Hill, Atlanta, Ga. The ring spindles are of the centrifugal type, made by the Draper Company, Hopedale, Mass.

The 802 looms are the Northrop type, E Model, made by the Draper Company, Hopedale, Mass. These looms are 40 inches wide; and 12 to 30 of them are operated by one weaver, according to her efficiency. The warps for all of these looms are webbed into the harnesses by one warp-tying machine, made by the Barber-Colman Company, which has displaced the labor of 16 drawing-in girls, and is a piece of mechanism of great delicacy and efficiency, with durability.

All of the product of this mill is piece-dyed on the machine invented by John W. Fries, Winston-Salem, N. C., and fully described and illustrated in the September issue of COTTON, page 359.

WEAVE ROOM

The cloth room is provided with machinery furnished by Curtis & Marble, Worcester, Mass., consisting of shears, brushers, sewing machines, etc.

The water tank, seen in the park in front of the factory, has a storing capacity of 20,000 gallons of water, 15 feet above the highest line of sprinklers.

The product of the mill consists of drills and sheetings, made primarily to supply the wants of the pad business of the American Pad & Textile Company, Greenfield, Ohio, successor to the E. L. McClain Manufacturing Company, but the surplus finds a ready sale in the general cotton goods market.

The establishment gives employment to about 400 people, being at the rate of 11.5 employees per 1,000 spindles, which, in itself, is indicative of the economical methods employed in manufacture, which will, perhaps, be better appreciated when it is stated that the average number of employees for 1,000 spindles is 19.33 in North Carolina, 18 in Georgia, 13 in South Carolina, 11.4 in Connecticut, 10.7 in Rhode Island, and 10.5 in Massachusetts. The establishment, therefore, is arranged and administered on the most economical system known to modern manufacture.

Together with E. L. McClain, the managing personnel of the establishment consists of W. M. McCafferty, manager; J. W. Brown, superintendent; and J. A. Miller, auditor.

THE FIRST COAL-TAR COLOR PATENT.

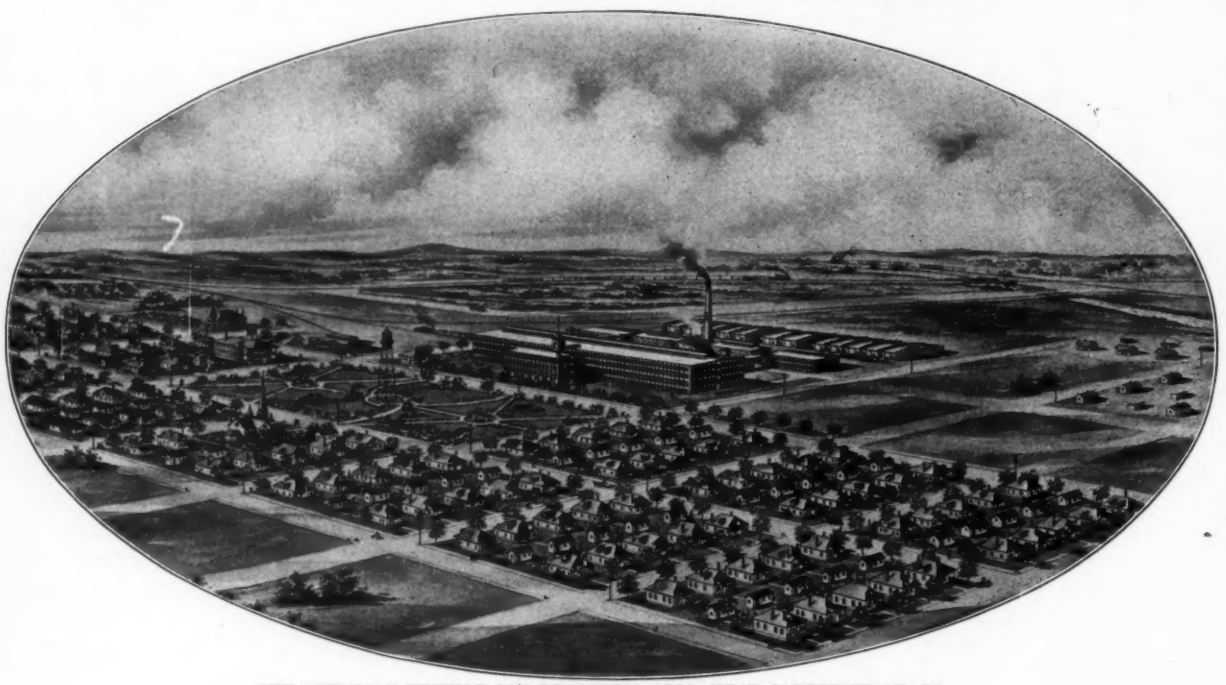
Provisional specification of the coal-tar color discovery of Sir William Henry Perkin was made on August 26, 1856, in which he declared the nature of his invention to be the producing of new coloring matter for dyeing with a lilac or purple color, stuffs or silk, cotton, wool, or other materials, and reads as follows: Equivalent proportions of sulphate of aniline and bichromate of potassa are to be dissolved in separate portions in hot water, and, when dissolved, they are to be mixed and stirred which causes a black precipitate to form. After this mixture has stood for a few hours, it is to be thrown on a filter, and the precipitate to be well washed with water to free it from sulphate of potassa, and then dried. When dry it is to be boiled with coal-tar naphtha to extract a brown substance from it, and this process must be repeated several times, until such substance is entirely separated. The residue is then to be boiled in methylated spirits to extract the coloring matter, and the spirit is afterwards to be separated from the coloring mattter by distillation. The coloring matter thus obtained is a solid of a bronze color. The coloring matter, when required for use, is to be produced with a given quantity of oxalic or tartaric acid and moistened with a little methylated spirit, and is then thrown into boiling water. The materials to be dyed are then to be immersed, the solution to be kept boiling, and when dyed they are to be washed with cold water to cleanse them from the acid. The materials thus dryed are of a lilac or purple color of a very durable character, the tints or shades of which may be varied by the quantity of coloring matter used.

No matter what other good qualities a fabric may possess, if the color combination is not right, the fabric will not sell, or at least, will not bring by any means what it should in the market.

The Manufacturing Village of Atco, Ga.

In the suburbs of Cartersville, Ga., and easily reached over good roads in twenty minutes, is the manufacturing village of Atco, owned by the American Textile Company, of which E. L. McClain, of Greenfield, Ohio, is the sole owner. The approach to this village is impressive, and, it may be said, charming, as nothing obstructs its full view, spread over a gently undulating plateau, one thousand feet above the level of the sea, as one sees it from a slight rise in the hill-side road. Everything about the village is new and modern, the health record of the place for the last two years, or more, showing absolute freedom from contagious diseases and practically no sickness of any nature.

There are nearly 100 cottages of three, four, five and six rooms each, and they are neither double nor two stories, but individual in character, no two being alike. Every room contains either a grate or provision for a stove. The bed rooms are not entered one through another, but from a hall-way, which allows of privacy. The houses are constructed of first-class material, double-floored and storm-sheated throughout. No one house is inferior in quality to any other on the grounds. Each house is within 300 feet of a hydrant, and has a water connection for drinking and domestic use, with the reservoir or stand-pipe in Cartersville. There are also a number of artesian wells, 60 feet deep, not far distant from any house, for the supply of well water, which is always refreshingly cool in the summer time to those who prefer it. The hydrants for fire purposes are located at every other street corner, and have a pressure of 85 feet head, enough to carry a stream of water to the top of any building. There is a small plat of ground attached to each house, where flowers or small fruits may be grown. Garden tracts are freely set apart on outlying lands, where vegetables may be grown free of rent, by the operatives or members of their families not engaged in the daily mill work. There is on the premises a well-arranged barn which is at the service of those employed in the factory, giving everyone an opportunity to have a cow and his own milk and butter. In connection with the barn there is a large pasture of 60 acres to which every family has free access, and is welcome. The barn is kept clean by the management, and there is nothing to do but to turn the cow in and keep her there during the winter months or in the pasture from early spring until frost kills the grass. Trees are planted along the street and inside of the house lots, and hedges are grown about the latter to give more or less privacy to household environments.



THE AMERICAN TEXTILE CO'S PROPERTY, ATCO, NEAR CARTERSVILLE, GA.

The village is lighted by electric arc lights, each of 1,500 candle power. The streets are mecadamized, edged with stone curbing, and regularly laid out at right angles, the blocks being arranged in squares. The sidewalks are made of crushed granite so a person can walk anywhere without encountering mud.

The village as pictured is true to facts, and conforms truthfully to the plans of the landscape gardener in the lay out of streets and houses, and of the park that is seen in front of the factory.

All scavenger work is done and paid for by the company. Garbage cans are placed at every house, all that is asked being that those occupying the buildings shall deposit their refuse in the outside garbage can to be taken up by the scavenger carts at stated intervals.

The company has made every effort to give the most

comfortable surroundings possible consistent with good business judgment. The best school building in the county where the mill is situated has been erected at an expense of $18,000, by the company, which conducts at its own expense a nine-months' school under the supervision of one of the best teachers that can be secured. The building is a spacious edifice, three stories and basement, 50 by 100 feet, all brick. The basement is provided for recreation, and is set apart for a play room for the children in cold and rainy weather. The school room proper is provided with modern desks, seats, blackboards, lavatories, closets for wraps and hats, and everything else that can be desired. The school building is also a public building, with an auditorium on the upper floor, where there is a stage with the usual appointments, a fine organ for music, and up-to-date seats to accommodate 600 people. In this room are held religious services, such as church, Sunday school, and prayer meetings, and the attendance upon these is not only interesting but very encouraging. In the same building there is planned a library which will be a regular feature in the literary life of any operative who desires to take advantage of the opportunity presented.

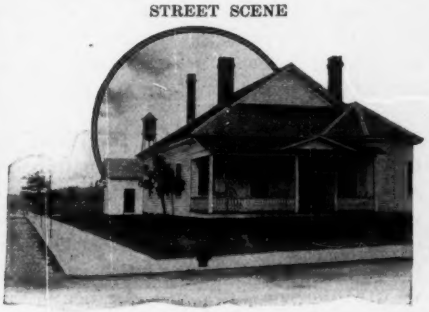
The company is making every effort that it can to upbuild the moral and physical condition of the people in its employ, and it is believed that the families, and especially the children, are far better off under the influence of the mill surroundings than they would be were they to remain on the farms whence they came. They have better educational facilities, better homes, more sanitary surroundings, and more opportunities to come in touch with the outside world through schools, churches, lectures, etc. As an illustration, when the company started in business three years ago, there were but two newspapers coming to the local postoffice, and they were the weekly editions of the Toledo (Ohio) *Blade*. Now there are over 100 different magazines and publications coming into the homes of the employees weekly. A great many of the employees are subscribers to the daily Atlanta papers, and a good many are taking a good class of magazines and periodicals.

The company has in view the erection of a spacious church. It has also a large commissary department, located in a building by itself, in which there is a mammoth refrigerator, where all kinds of choice meats are kept with fresh eggs and butter in ample supply. The operatives are not under any obligations to patronize this department, but can make all of their purchases wherever they please, in the adjoining town, or elsewhere. The commissary is really established to meet the necessities of the village, and is for the convenience of the mill hands for them to take advantage of or not as they see fit.

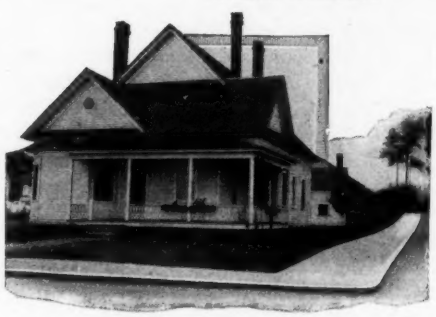
The company supports a physician and nurse, their services being given to employees at a nominal cost in case of sickness. There has also been appointed a woman welfare manager, who teaches domestic economy and other things conducive to the welfare of the community.

PUBLIC BUILDING

STREET SCENE



FIVE ROOM COTTAGE



SIX ROOM COTTAGE

A convenient method for identifying mercerized cloth consists, according to David, in pinning a boiled, and, if necessary, stripped cutting over a frame, spotting it with caustic soda of mercerizing strength, washing under tension, and hereafter dyeing with some direct color. If the fabric has not been previously mercerized, or consists but in part of mercerized yarn, the "spotted" parts will come up darker than the rest.

The eye of the student must be trained so as to know what is good and what is bad in color combination.

ADVERTISING TEXTILES TO THE CONSUMER.

Advertising Should be Looked at Squarely.—It Has Made Great Fortunes,—Goods Should be Identified.—Goods Should be Distinctively Marked.

Written Especially for COTTON by Stanley R. Latshaw, of *The Ladies Home Journal.*

(*Continued from November.*)

One of the objects that we continually strive to attain, the thing we should most wish you to do, is to look this question of advertising squarely in the face. You will always have a vast bulk of unadvertised and unidentified textile fabrics that are sold, and will always be sold to the undiscerning. So be it. As a manufacturer who seeks in every honorable way to better his equipment, his mill, his machinery, his employees or his name, it is your duty to give heed to this new force in business—this advertising.

History tells us that when Oregon and Washington were proposed as new territories, and to eventually become States, many of the leading minds of the times opposed the idea. They advanced endless figures to show how impracticable it was to have representative government, where much time would have to be consumed by a congressman or senator in the mere getting to and from congress—on horseback. Fortunately the more far-sighted won, and today, with our fast moving trains, our telegraph and telephone—what is distance?

Now you all concede that advertising has made great fortunes for the manufacturer of patent medicines, candy, soap, flour, canned goods, pickles, razors, etc., etc. But when you want to apply the same principles to your own industry, you demur many times, on the ground of present fixed conditions. Your contention may be right, but what we want to secure is your co-operation in the consideration.

If you would like to advertise, and think that conditions will not warrant such an action on your part, then we can convince you that you have gone a long way toward finding a solution. In writing to you and working with you, let us not take opposite stands and fence one foil against another. Your interest is ours. If you will but look close enough, you will see that your ultimate success is inevitably our whole concern.

The principles of advertising are simple, logical and obvious, but the application varies in a thousand cases. You manufacture a certain line of cotton fabrics. In some way it possesses advertisable merit. If it is a new and special fabric, its points of superiority are primarily novelty, style, adaptability, etc. If, on the other hand, your goods are staple, are they honest goods, with the right material and workmanship? We assume that they are. In either case, whether you have a novelty or a staple line, your methods of exploitation are much the same.

First, you must identify the goods. Now right here is the heart of the whole being, and it is the prime thing requisite. Advertising is an introduction, a recommendation, a guarantee, an invitation to buy a certain product and give it a trial. Of course, if the trial is granted, and a patron and a friend secured thereby, then, after that, advertising keeps that friend in touch with your movements, with your latest creations, and suggests new uses for the old product. Manifestly, therefore, in the introduction you say: "You will know my goods, of which I have just spoken, by my trade-mark or my ticket, my package or my signature, etc., etc. When you next go to your dealer, ask for my goods. You can identify them as I have just indicated."

Of course, you can advertise and ask the purchaser to demand your fabric, and *assume* that the dealer will give her your goods, even if unidentified. But assumption is poor practice in business, and you have practically no redress against the dealer who substitutes an inferior article and says to a woman: "This is it." She takes it, unsuspecting, and if disappointed, holds *you* responsible.

You should mark your goods. The methods of identification are many, and should be studied that the best in each particular case may be adopted. Of course, a selvage mark is best, but only on a "Jacquard" loom or with a "Jacquard" attachment is this practical, and then only in silks and such fabrics is the woven selvage mark worth considering. The marking with distinctive bands and foot tickets is good, as far as it goes. In fact, it is advisable, if you are going to make your merchandise distinctive and individual. We have, in some cases, advocated the folding in of a continuous tape, say of white paper like ticker tape, with your trade-mark and name printed thereon. This tape can be conveniently handled, and if it breaks in the winding, no harm is done, but this tape scheme is not good for cottons that are unwound frequently and thrown out on the retail counters, as the preservation of the tape would be a nuisance to the merchant.

You can also design a striking and distinctive ticket, bearing your name, which can be tied to the end of the piece and remain there until the last yard is sold. We know of a machine for cotton goods, which doubles, folds, trade-marks (prints) and measures. When a sufficient number of these machines are manufactured, the question of trade-marking will be solved.

And here let us urge another consideration for the future—your trade-mark. Granting that you are not convinced that advertising to the consumer is the best policy to pursue, and granting that you may not advertise for some years to come,—when you *do* advertise you will want to exploit your trade-mark. And *now* is the time to adopt one. You already have your trade names for particular qualities and numbers. But what we urge you to do is to adopt a general trade-mark, name or symbol for all your products. The word "Hydegrade" covers the whole line for A. G. Hyde & Sons; "Veribest" for Armour; "Heinz 57 Varieties" for pickles, and "Inner Seal" for the National Biscuit Company. All have their symbols. You should also adopt a symbol, a mark or a sign that is easy to remember. At the top of the ballots, the party symbol keeps many a voter in the right column, and likewise your symbol, when once known, will keep many a customer from straying.

Of course, this talk of trade-marking and identifying your goods is a very important question that cannot be settled off-hand. That private tickets mark a considerable portion of your production is probably the case. And this fact is the one consideration that deters so many of you manufacturers from giving a hearing to the facts in the case. You overlook the greatly increased value of your goods in the estimation of the dealer, because of your advertising. You have created a demand for your goods; they are called for and sell readily. You never have trouble in selling a man something that he can sell easily. Soon your ticket and your brand name, with the advertising prestige behind it, will be more desirable, more valuable, more

eagerly sought by the merchant than a private ticket of his own, even carrying something additional in the margins of profit. The commission houses and jobbers have recognized this condition, where a few years ago some doubt and hesitation was evident in their attitude. Today the leading commission houses and large jobbers, not only encourage intelligent advertising, but in a number of instances, where they control a line, advertise it themselves.

As to the particular channels through which your goods reach the retail counter, we are little concerned. It really doesn't make any noticeable difference in the general results, for when you create a demand, the supply of your goods go through the path of least resistance to the customer—the consumer. Questions as to the methods of dealing, whether through the jobbing houses or direct with the retailer, remain, as always, a matter to be decided by your sales management. Create the demand and your commission house will take care of the rest.

LOADING AND SHIPMENT OF COTTON.

BY L. GREEN.
Freight Traffic Manager, Southern Railway Co.

It would appear difficult for any one to present any new information respecting the inadequate supply of railway equipment in view of the notorious fact that the commercial interests of the country have for several years suffered because of car shortage during the busiest seasons.

The public has been clamoring for relief and railway managers everywhere are trying as far as it is within their power, to remedy the situation. This cannot be done without the earnest co-operation of the shippers and consignees towards getting the best use of equipment, because in that way alone can any immediate relief be obtained.

The economic necessity which demanded cars of increased carrying capacity, demands that the increased capacity be utilized. Cars cannot be built fast enough to supply the demands of our rapidly growing commerce, and it is of paramount importance that every available car be made to accomplish the maximum of usefulness.

As a matter of fact, the car shortage is not due so much to a real deficiency in the *number* of cars, as it is to the fact that the cars in service are not being used to the best advantage. Indeed many carriers have an abundant supply of equipment both with respect to number and capacity, but there is a tremendous economic waste in their use growing out of the fact that they are not loaded to their capacity and this is probably true with respect to the cotton traffic more than to any other.

The railways themselves are as much to blame as the shippers for failure to get the best results from the use of equipment in handling cotton. They have for years moved the crop of cotton from country stations to compress points with an average of 25 bales in a car. It has been demonstrated that with careful loading, 51 uniform bales of uncompressed cotton can be loaded in a standard box car, and an average of 42 bales can probably be obtained. Our company, and some others in the South, have undertaken to enforce the loading of uncompressed cotton for its initial movement to the compress point, to the full loading capacity of cars, and if this can be accomplished, you will readily see that the efficiency of equipment used in the first movement of the cotton crop will be increased approximately seventy per cent.

For many years the unit of loading compressed cotton has been 50 bales to the car. This unit was adopted for two reasons; first, because of the practice in buying and selling cotton in units of 100 bales. This number could not be loaded in an ordinary car and it was no advantage to load three fourths in one car and one fourth in another.

Second, the standard car when this loading was adopted was 34 feet in length. Compression not so good as at this time, and 50 bales was about all that could be put on end on the floor of a 34-foot car. The present standard car is 36 feet in length, and it is easy to load 60 bales of cotton, as now compressed, on the floor of a 36-foot car. 15 additional bales can be placed on top of those bales that are loaded on the floor. In brief, it is now an easy matter to load 75 bales of compressed cotton in a box car of the present standard, and the railways are trying to secure such loading. If their efforts succeed, the efficiency of cars used in the transportation of compressed cotton, will be increased nearly 50 per cent.

Some of the compresses have contracted to make 75 bales the minimum load. We hope to make contracts with all of them on this basis. Many of the Southern spinners have agreed to co-operate by ordering their shipments in units of 75 bales. We are anxious that the New England spinners should adopt the same plan. We are told that the chief difficulty grows out of the fact that cotton is sold in units of 100 bales and the practices of the New York Cotton Exchange are therefore involved. We respectfully answer this objection with the suggestion that this matter is of too large importance to be subservient to the unit rule of the New York Cotton Exchange, which could doubtless be altered without injury to anyone.

To get the best use of rilway freight car equipment is a matter of national importance. It cannot properly be said that the railways alone are to be benefited by an increased use of cars. That is an exceedingly narrow view of the matter. The expansion of the commerce of the whole country is held in check by inadequate railway facilities largely because of an economic waste of the facilities we have, that would not be tolerated for a moment in any well managed private enterprise. Every class of traffic requiring the use of freight car equipment would be benefited by an increased efficiency in the use of that portion of the cars engaged in the handling of cotton. The cotton itself would be transported more quickly and everyone interested in its production and sale would receive a direct and substantial benefit.

The cuticular and protoplasmic layers of cotton absorb basic dyestuffs, such as safranine, and retain the color when washed with boiling alcohol. The retention of dyestuff under these conditions is considerable in the case of raw cotton, but decreases in proportion as the fiber is purified; in all cases, however, the cellulose is completely moved by treatment for half an hour with caustic soda lye of mercerizing strength.

A systematic study of color is one of the very first things to be considered in the education of the textile student.

The methods of baling cotton in America cannot be too severely condemned.

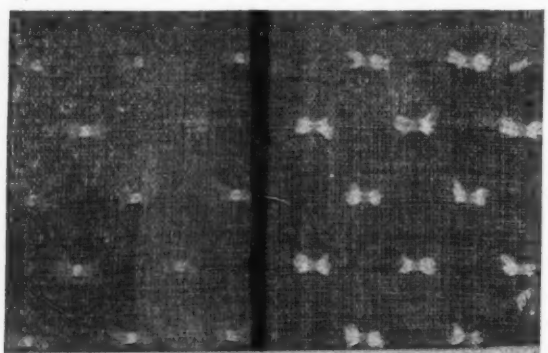
COTTON MANUFACTURING.

FIGURING WITH EXTRA FILLING.

BY THOMAS NELSON.

This system of making fabrics is extensively used in the cotton goods trade, especially for white goods. The object aimed at is to produce spots and figures of all descriptions arranged in different orders or systems on a regular fabric. Shirt waistings are oftentimes made in this way, and for curtain goods this system is used very extensively. These fabrics are always made on a drop-box loom, as the filling for spotting is generally coarser or heavier than the filling for the body of the cloth and is also soft twisted.

The spots or figures, as previously stated, are made in every conceivable form.



Face Fig. 1 Back

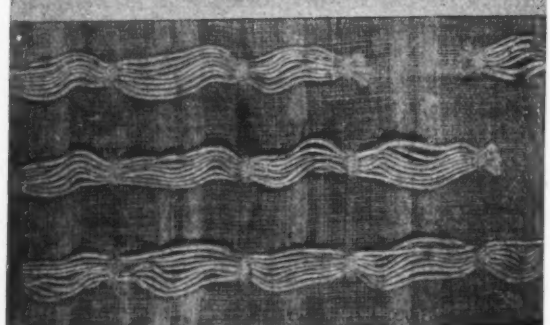


Fig. 3 Back

Fig. 1 illustrates a shirt-waist fabric with one of the simplest spots in it that can possibly be made.

Fig. 2 illustrates the design for one spot with twelve plain picks on each side of the spot. It will be noticed that the design has been made so that the spot formed by the extra filling will be on the under side of the cloth, and the filling not being used for the spot will float on top of the cloth, or in other words, the cloth is woven in the loom with the wrong side on the top and face of cloth on the bottom.

Fig. 3 illustrates a shirt-waist fabric as it is woven in the loom, showing the extra filling floating, before being cut off. The reason for weaving these fabrics with the wrong side

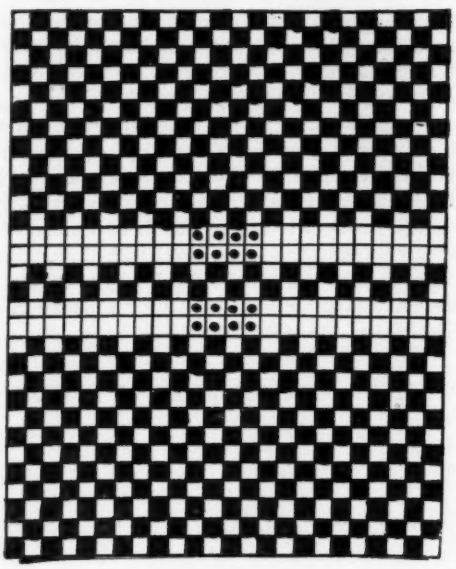
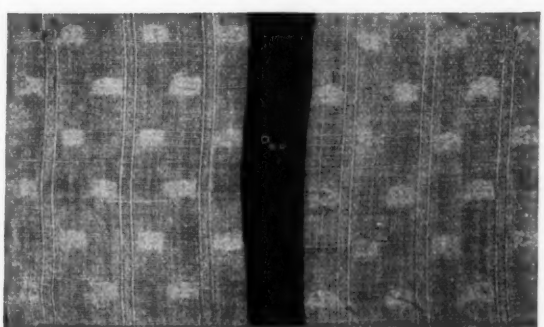
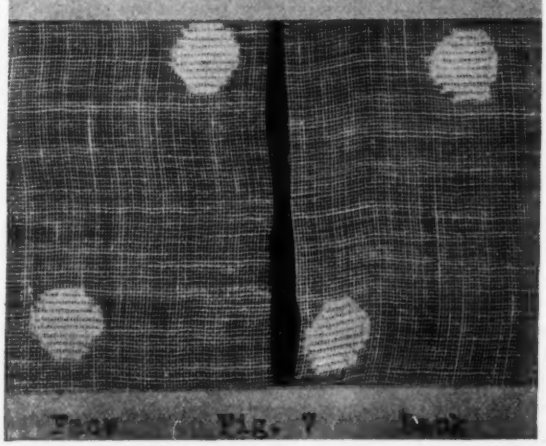


FIG 2



Face Fig. 4 Back



on top is to save a heavy lift of the harness, for it will be seen that, when the extra filling is being inserted, only the harness for the figure is required to be raised. On the other hand if the fabric was woven face up, all the harnesses except those used for the figure would be raised and

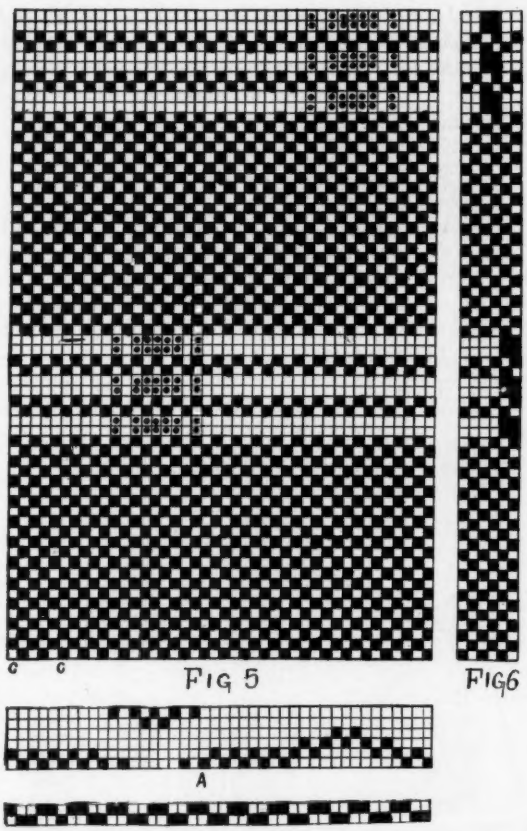


FIG 5 FIG6

this would make a heavy lift. In fine shirt-waist goods, however, the extra filling on the top of the cloth is a source of annoyance to the weaver, and, if the weaver is in any way careless, many "floats" are passed that ought to be "picked out." These floats are often caused by the thread breaking and becoming tangled with other threads behind the reed, thereby preventing them from opening to form the shed and causing them to float together, hence the term "float." The loose filling on the top of the cloth prevents the weaver from seeing these floats unless she is attending strictly to business.

After the fabric is woven, this extra filling which floats between the figures, is cut off. This brings up another point. Take Fig. 1 for example. It will be seen that after the extra filling has been cut off between the spots, the filling in spots is only held in position by the compression of the picks in the fabric, consequently the extra filling in spot is unable to resist friction, and easily pulls out. One method of overcoming this objectionable feature is by binding the extra filling on both sides of the spot.

Fig. 4 illustrates a shirt-waist fabric made on this principle. Fig. 5 illustrates the design, drawing-in draft and reed plan. Fig. 6 is the chain plan for same. The two cords in the fabric give to the fabric a better appearance. Each cord occupies one dent and is marked *C* in the design. Care is required when making out the drawing-in draft for the spots. Two adjoining threads must not be drawn through the harnesses consecutively on either the even or uneven harnesses, or a faulty place will result when weaving plain cloth. For example, a ground thread is drawn through the first harness in the drawing-in draft *A*, but the next thread which is for the spot must be drawn through an even number harness, so that when making plain cloth, the two threads will weave opposite to each other. If the thread for the spot had been drawn through an uneven number harness, the two threads would have worked together in the plain cloth.

Another method of preventing the extra filling from pulling out of the spot easily is to weave the spot perfectly plain, that is, when the extra filling is being inserted, the harness for making the spot will weave plain. The spot figure shows up very clear because the extra filling is much coarser than the other yarns used in the fabric. This method is used very extensively in curtain goods when the figuring takes the form of spots. To illustrate this principle, a line of samples is given at Figs. 7, 8, and 9. The extra filling forming the spot in each fabric weaving perfectly plain.

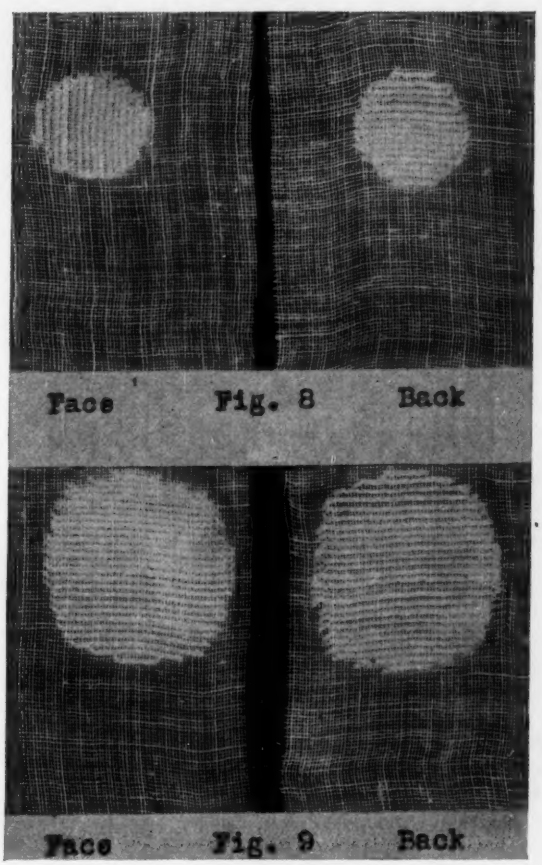


Fig. 8 Fig. 9

The design for Fig. 7 is given in Fig. 10, which illustrates clearly the method of constructing the spots. The spots are arranged in the three samples given in plain weave order with the same construction of fabric in each case.

From the examples given, it will be seen that practically the extra filling used for the spot does not in any way assist in forming the fabric proper. The spot is intended as an

ornament to the fabric. Knowing this, and knowing also the manner in which the extra filling is inserted, it will be evident that, in order to prevent a thin place being made in the cloth, the catch-on take-up gears must be raised. The catch is connected to a harness lever in the dobby, and when the extra picks are being inserted, this lever is raised which raises the catch from the take-up gears and the cloth is not drawn down on those picks.

The extra filling when being inserted in the fabric can be bound at the sides of the cloth either by the selvages or by a catch cord. When bound by selvages, two-harness shafts are used which carry only the selvage heddles, and these two shafts weave plain continuously through the cloth. If binding the extra filling in this manner causes the selvages to become tight during the weaving a catch cord can be used. This cord is simply a few threads drawn through a heddle at the side of the threads in warp, and then through

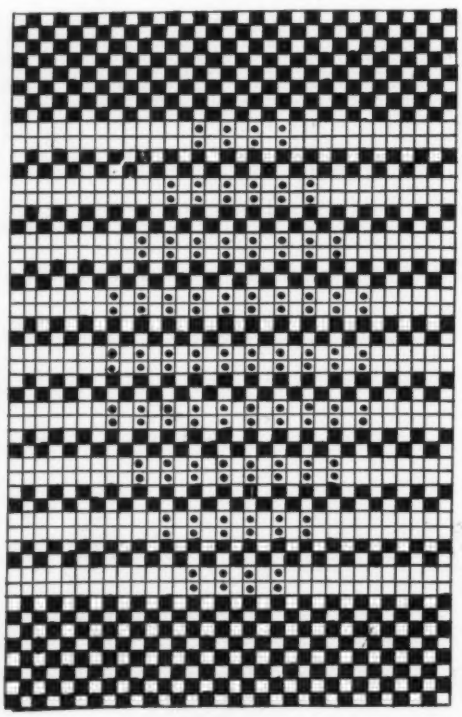


FIG 10

the reed with three or four empty dents between the cord and selvage. The heddle can be put on a separate harness shaft and shaft connected to a harness lever in the dobby in the usual manner, but is only raised when the extra filling is being inserted and this binds the filling outside the selvage. When a length of cloth has been woven this cord becomes slack and this slack must be taken up. If this is not done, the cord will be pulled into the spot near the edge of cloth, and when the extra filling is being cut off by the cutting machine a hole is cut in the cloth at that point.

In estimating the cost of these goods the production has to be carefully considered. The more extra filling there is in the fabric the more the fabric will cost to produce, since the extra filling does not actually form the fabric, and the take-up gears are stopped on those picks, thereby causing less production from the loom. Another point that also has to be taken into consideration is the amount of extra filling cut off, as this filling has to be sold as waste.

COTTON WASTE SPINNING.

Cotton Waste Has Its Usefulness.—Until Recently, Continental European Spinners Have Led the Trade.—Two Classes of Waste, Hard and Soft.—Cotton Waste Yarn Suitable for Flannelettes, Blankets, Rope and Twine.—There Are Two Systems of Machinery, the Condenser and the Coiler.

BY H. R. CARTER, TEXTILE ENGINEER.

In years gone by cotton mill waste was thought to be valueless and was deposited in great stacks in the fields to rot and form manure. Increasing competition in the trade at length suggested an inquiry as to whether this waste could not be utilized more advantageously. The question was hardly asked before it was answered, and one grade after another of this so-called waste was applied to some useful purpose. That made in the manufacture of the finest yarns was mixed with the next lower quality; and that from the lower with a still lower quality, and so on through the series.

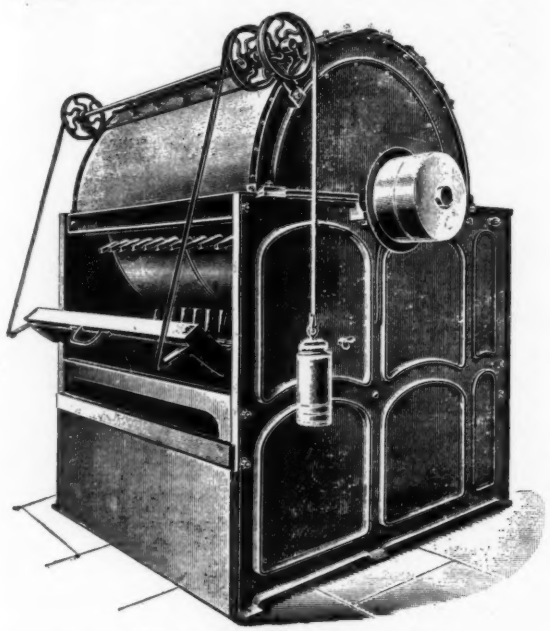


FIG. 1. WILLOWING MACHINE.

There are firms of world-wide reputation today which were founded upon waste bags. Being among the first to apply this material to some useful purpose, they got the benefit of their perception, which was keener than that of their fellows, although even in their case, many were the poignant regrets occasioned when the money already wasted was thought of. But these availed nothing, beyond sharpening the perception of the trade to prevent similar losses in other materials and ways. So keen became this sentiment that successful attempts were made to utilize the very lowest waste—the sweepings of the room floors—that contained any fiber at all. Bump and barchant yarns were the products of these.

Until recently Continental spinners have led the trade in this branch of the spinning industry, and a large portion of the waste made in England was shipped to the Continent to be there spun into yarn and woven into cloth, both yarn and cloth being often re-imported into the country. Even now, although English spinners produce the best ordinary prepared and condensed waste yarns, they cannot or will not spin up the shortest waste from which their Continental brethren make a very serviceable yarn.

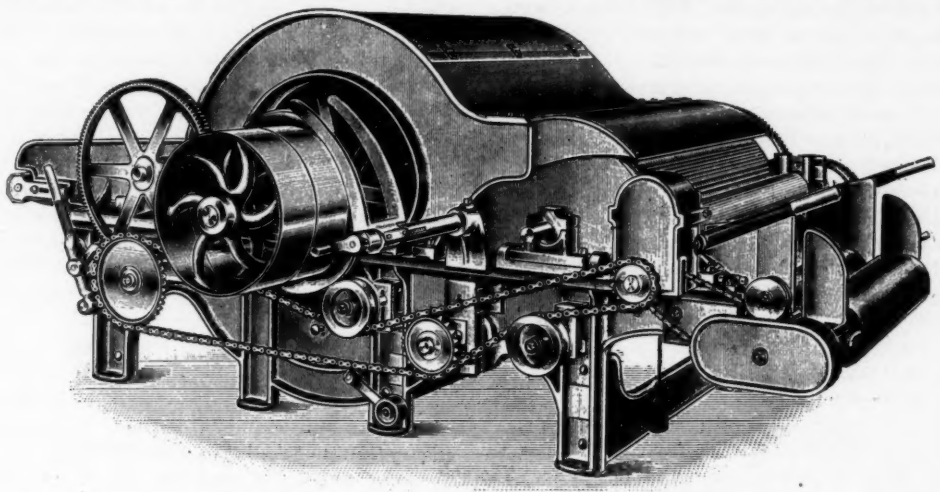


FIG. 2. PREPARING MACHINE FOR HARD WASTE.

The reason why Lancashire exports so much cotton waste to the Continent is that thirty years ago Continental machine makers improved upon the then exclusively English made carding and spinning machinery, and Lancashire lost its cotton waste trade to Germany, Austria and Belgium. In these three countries the cotton waste trade has grown to such an extent that even Lancashire is satisfied to ship her waste to the Continent and to re-import the yarn made from it, at the expense of the home industry. Thus England pays away over $15,000,000 per annum for foreign yarn which could easily be spun at home. English spinners and machine makers have recently come to look at matters in that light, and as a result English cotton waste machinery has been brought up-to-date, and many cotton waste mills have been erected and are being erected today. The large quantity of cotton waste machinery which is being shipped to the Continent is a clear proof that English makers are no longer behind the times, but may be even said to lead, as they do in textile machinery in general.

Cotton waste may be roughly divided into two classes, one known as hard and the other as soft. The former includes "cop-bottoms," "ring-frame reelers," and other wastes of a thready nature. The latter includes scutcher droppings, card fly, cylinder and flat strips, clearer laps, sweepings, comber waste, etc. Comber and cleaner wastes are clean, but sweepings are frequently oily and dirty. Low classes of cotton, card waste, dirty and oily cleaning waste, and all kinds of short, dirty and useless staple are also mixed in waste spinning mills.

In treating cotton waste to the best advantage it is essential to separate the better from the lower qualities, using the hard and comber waste for the fine counts, and the other kinds of soft waste and sweepings for the lower counts.

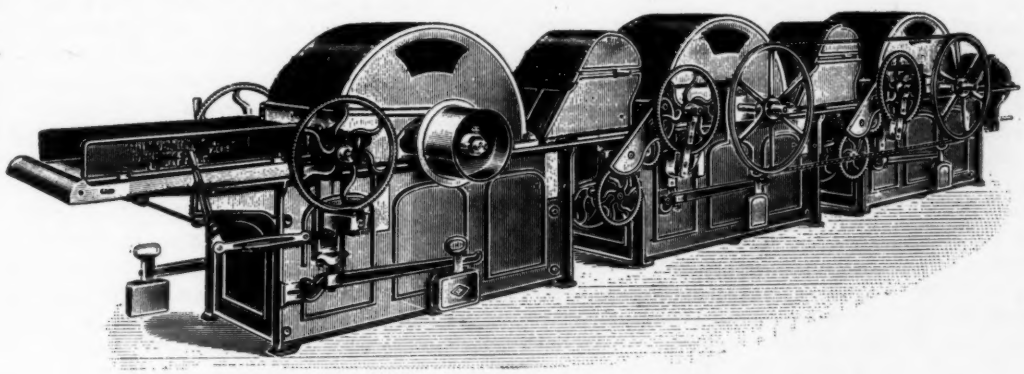


FIG. 3. WASTE BREAKING-UP MACHINE.

Cotton waste spinning, in order to give the best returns, should be carried out in separate mills, for the grades of waste vary to such an extent that even in large cotton spinning concerns a plant can only be installed to deal satisfactorily with a few classes.

Cotton waste is specially adapted to spin a full, level and soft spun yarn to be used as filling in gray cloths, sheetings, flannelettes, quilts, cotton blankets, cleaning cloths, etc.

There are two systems of machinery in use for spinning cotton waste. The "condenser" system, which is a modification of the woolen system, gives the fullest yarn, while the "coiler" or preparation system, which is somewhat like the cotton system, produces a less bulky and in general a stronger yarn. The condenser system is found to give the best results where a full level and soft spun yarn is required. The yarn thus produced is generally used as weft and is woven into sheetings, flannelettes, quilts, bed covers, cotton blankets, sponge cloths, etc. The condenser system has the advantage that both "hard" and "soft" waste can be spun either separately or mixed together.

The coiler or preparation system is most suitable where strength is of most importance, and where counts above 10's are wanted. It is well suited to the spinning of hard waste, comber and soft waste free from shell and leaf. Yarn thus produced is used as a weft in weaving into cloths to be printed or dyed, such as cretonnes, also for towels, etc., and is also reeled into hanks or wound into warps or chains, and sold to rope and twine makers. The cost of production is less than on the condenser system, and at the same time the range of counts which may be obtained from the same plant is greater.

For spinning counts say 5's to 10's, from "hard" waste, including cop bottoms, etc., the first machine required is an opening and cleaning or willowing machine, (Fig. 1), which loosens the cop bottoms, shakes out the dust and removes any foreign substance which may be in the waste. The machine consists of a revolving cylinder fitted with rows of strong teeth which throw the waste against other rows of teeth attached to the bars in the cover. The machine is also provided with back and front dust grids and a fan for removing the dust. The waste is put into the machine by hand, through an opening provided by a movable grid which is then closed. The machine is then started, and after a short interval the grid is opened and the waste taken out. This machine can be recommended where a production up to 20,000 pounds per week is required. Where a larger production is needed a waste preparing machine (Fig. 2), is recommended. This machine, which is usually made narrower than the willowing machine, consists of an iron lattice for hand feed, one pair of feed rollers covered with toothed discs, and iron cylinder covered with hardwood lags, fitted with strong steel teeth, an iron doffer covered with metal plates fitted with hardened and tempered steel teeth, and two iron calender rollers which strip the waste from the doffer and deposit it upon the floor.

The waste breaking-up machine, Fig. 3, combined with a self-acting soaping machine, is the next machine required, although the previous machines are sometimes dispensed with and the cop bottoms fed direct from the bale upon the feed lattice of the breaking-up machine. For breaking up cop bottoms this machine should have either six or eight cylinders according to the floor space available. The cylinders are of wrought iron, and covered with hardwood lags fitted with hand forged steel teeth. Owing to the high speed of the cylinders (800 revolutions per minute) the entire cylinder, shell, arms, and bosses are of wrought iron and welded, the shell being a continuous sheet with the ends welded together. The first cylinder is fed by a lattice creeper, which delivers the waste to a set of three feed rollers. A reversing motion is provided so that both feed lattice and rollers may be run backward at will should a choke occur or should any foreign substance get between the feed rollers. The feed rollers should be provided with bearings of sufficient length, and constructed in such a way that the rigidity of the feed rollers in the middle is secured so that they may hold the material firmly while it is being opened by the cylinder and not allow it to be plucked through. Between each pair of cylinders are the usual cages and cage gearing. For opening very dirty or dyed cotton waste, it is advisable that the machine be fitted with a fan and cast iron dust pipe for down-draught behind each cylinder. If the length of the room is limited it is a good plan to use say two three-cylinder machines, a lap machine being attached to the delivery end of the first machine and supplying laps, five of which can be placed on the feed lattice of the second machine. One passage through a six-cylinder machine will usually be found sufficient for thread waste, say up to 40's counts, giving an average production of from 5,000 to 6,000 pounds per week of 56 hours. The cylinders are sometimes driven by separate belts, but often one belt is made to drive two cylinders; in this case the second is driven by a side rope or belt from the first.

(*To be Continued.*)

KNITTING NEEDLES.

The ordinary spring bearded needle, with three parts, has the shank generally flattened to facilitate the casting of it into a lead, also the beard and the eye, the latter receiving the tip of the beard when the latter is pressed.

The ordinary self-acting or latch needle has a shank, hook and tumbler latch. The shanks are made either flat to be soldered into jacks or are turned so as to form a butt upon which a fixed or travelling cam may operate.

The ordinary fashioning or lacing point needle has a shank which is generally flattened so that it can be cast into a lead, a large eye for the reception of the beard of the needle, and a point which, pressing in the eye of the needle, guides the point itself on to the beard of the needle.

There are special needles as: Single and double twisted bearded needles; bearded needles with turned shanks; double-ended bearded needles; double-ended latch needles; needles with hook and latch at one end and beard at the other; double-ended needles bent angular; dummy needles, *i. e.*, no beard or no latch; the pelerine point, having long, flexible end; eyelet points, containing small eye for fashioning on latch-needle frames; and many patent needles such as split needles, loop transferring needles, etc., etc.

From 1896 dates the foundation of mercerizing as an industrial process, and prophetically enthusiastic as were many writers of that period and for a few succeeding years of laborious and costly experimental work, none was optimistic enough to forecast the remarkable success mercerizing has met with.

Seventeen years have passed since Lowe's patent put on record certain conditions controlling the peculiarly remarkable influence of strong alkaline liquors on the cotton fiber; and somewhere about fifty-seven years have elapsed since the memorable and important investigations of John Mercer.

Almost the first application to the mechanical arts of the burner invented by Bunsen was seen in the singeing machine.

KNITTING.

THE SINKER MECHANISM IN KNITTING MACHINES.

BY ROBERT C. CHILD.

(Concluded From November.)

It is sometimes desirable to retain the device of independently movable radial sinkers in use with the circular cylinder of the fixed spring beard needles. For one thing, a much larger number of sinkers can be retained in their forward position than if they were mounted on a wheel, and for another, there is then no difficulty from causing the yarn to reeve around several partially projected sinkers, owing to the motion of the fully projected sinker; but however employed, a sinker should go to its furthest projection before its neighbor has moved very far in between the needles. With independent sliding sinkers, a cam having a very steep face can be employed to rotate with the yarn-feed and the pressing, landing, and knocking-over devices, and accomplish this. In the well-known automatic straight bar machines, called Cotton's machines after their inventor, William Cotton, an even more effective separation of the active and inactive sinkers is obtained by employing a radius-bar or pivoted jack for each sinker, which rests with its free end against the outer end of the sinker, and then acting on the jacks, at a point near their pivots, by such a cam. A very slight motion of the jack at the point acted on by the cam will throw in the sinker its complete distance, and a relatively steep cam need not be employed to secure moving one sinker all the way in before its neighbor has moved at all.

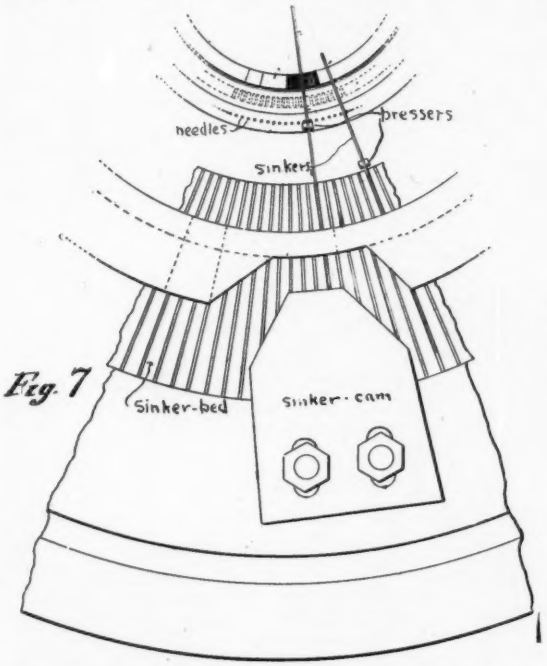


Fig. 7

Fig. 7 shows a simple cam and sliding sinkers employed with a circular machine, the sinkers also having an attached pressure-lug like that shown in Fig. 3. (See November issue.)

In Figs. 8 and 9 is shown a more elaborate machine, in which the sinkers have also an up-and-down motion, and in which independent sliding pressers are employed; these also being moved in to press the beards of the needles by rotating cams. Fig. 10 shows clearly the various steps in the cycle of operations.

So far we have considered only the true sinker, which measures off and places the yarn on the needles, which could form no loops otherwise, being themselves individually immovable. But a large, and in this country the most important class of machines employs endwise-movable latch-needles, which only need to be supplied with yarn and to be moved out and in successively, between some simple knocking-over device to prevent the loop from following the needle, to form their stitches perfectly.

In order to take care of the fabric formed on these independently-movable latch-needle machines, and to keep the loop from following the outwardly moving needle, the fabric must be kept under tension, as by the use of take-up rollers, or a weight attached to it. This is all very well when a continuous flat piece or tube of fabric is being formed, but where there is no fabric on the needles to begin with, or where for any reason the tension of the knit web becomes slack, the loops of yarn will follow the needles

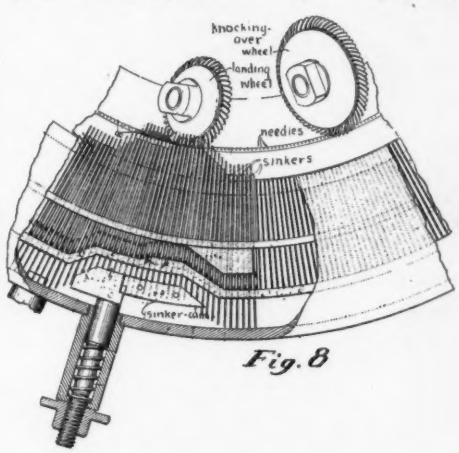


Fig. 8

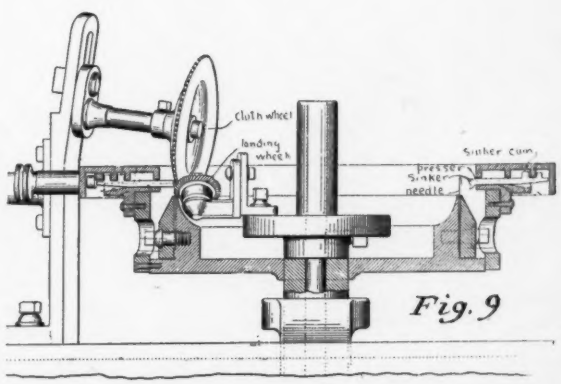


Fig. 9

when they are projected, and will not knit, or do so imperfectly.

This defect is especially troublesome in the production of stockings on circular machines, the bulges or pockets made in the tube to form the heel and toe preventing the proper tension of the loops in the tubular fabric made on the needles employed to knit them. The identical device employed with the fixed-needle machines to sink the loops onto the needle shanks has been found to solve this difficulty; its function is, however, different, since now its use is not to force in the new yarn to form loops between adjacent needles, but to act on the yarn extending between the loops of the last course knit, and maintain the tension on the loops of such needles as are moving up. Incidentally, the part of the instrument extending between the needles serves also to hold the loops from moving down when the needles move down, and so acts as a knocking-over bit. This kind of sinker is properly called a web-holder, since its use is only to hold stationary the already-formed web.

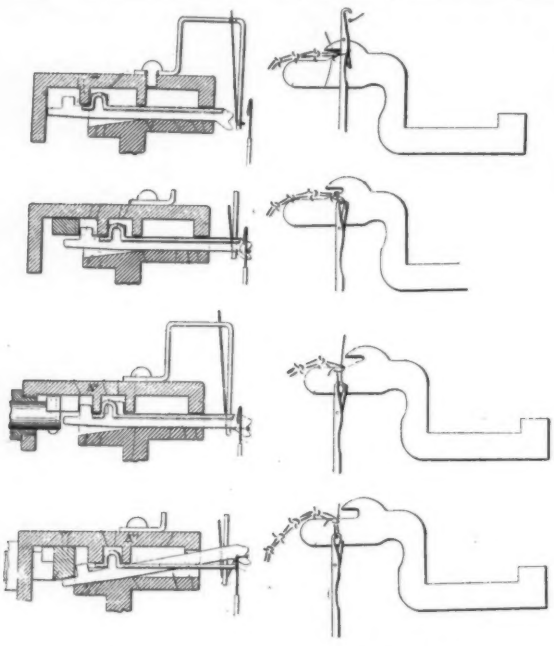


Fig. 11

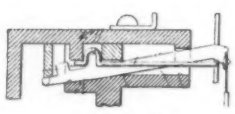


Fig. 10

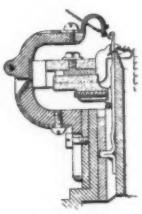


Fig. 11a

Figs. 11 and 11a illustrate several different positions of one typical web-holder of the many existing forms, for a circular stocking knitting machine, and its position in the machine, while Fig. 12 illustrates the cams to operate it. It will be seen that the web-holder is withdrawn so that its notch is outside of the needles when the needles are drawn down to knock over the stitch, and is then thrown in so that the notch catches and holds the yarn extending between the needles.

Fig. 13 shows how much the same device may be used with a flat-bed independent needle machine, to serve the same purposes. Machines with such devices will start knitting on supplying yarn to the bare needles, and the take-up device is not necessary with them, although it may be employed to insure more even fabric and to take care of the web produced.

Much the same effect as that of the movable web-holder may be produced by employing at the top of the needle-cylinder a fixed hook like that shown in Fig. 14, into which the yarn of the last course knit is carried by the downward pull of the needles.

Fig. 14 shows an ingenious extension of this idea to utilize such a notched fixed web-holder to aid in forming the fleeced fabric shown in the same figure. The operation will be readily followed by noting the position of the needles and yarn in succession from right to left in the figure.

The mechanisms above are only types of those in wide use, and this important agency in knitting machines is being almost daily improved and utilized in new ways.

While mercerizing has been used in its original features since its conception, notably in the production of crepon effects and for the treatment of union materials of varied composition and in the preparation of printers' blankets, it is the modern modification of it, based upon the prevention, by mechanical means, of shrinkage, that is of foremost interest.

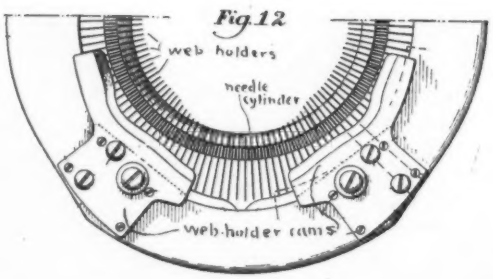


Fig. 12

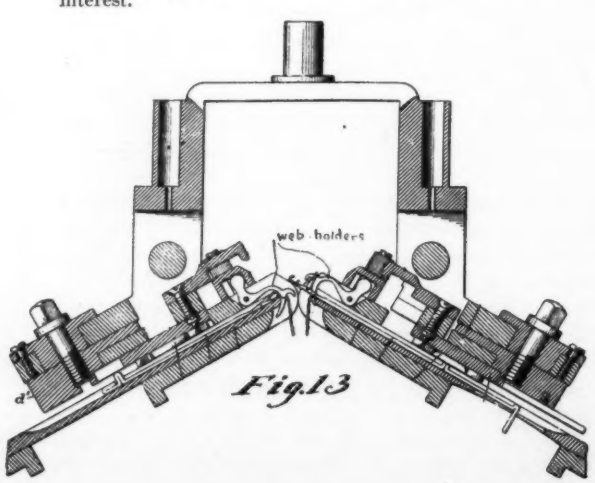


Fig. 13

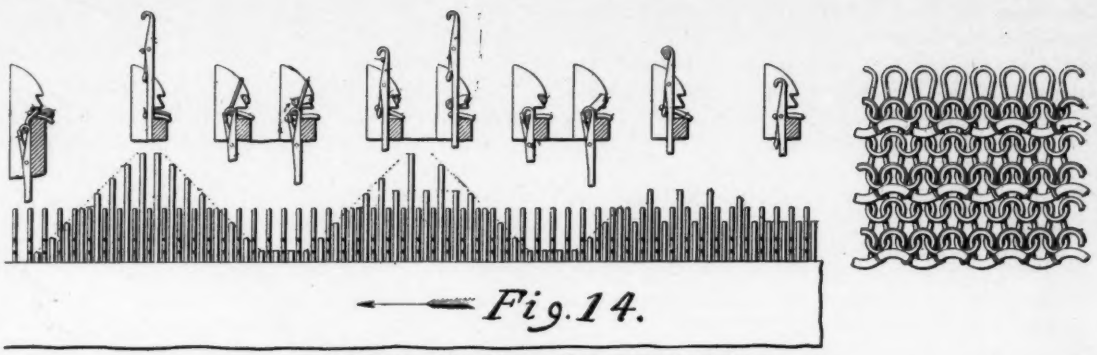


Fig. 14.

THE SINKER MECHANISM IN KNITTING MACHINES

Dyeing, Bleaching and Finishing.

BLEACHING COTTON FABRICS PREPARATORY TO DYEING.

BY ARTHUR H. ROCKE.

The bleaching or scouring of cotton fabrics before dyeing is a subject much discussed among practical dyers at the present time, opinions varying widely as to the best and cheapest method.

The writer, whose business has for the past twenty years brought him into daily contact with practical men engaged in textile bleaching, dyeing, printing and finishing, has many times been struck by the almost slavish adherence to old ideas and methods exhibited by very many of the men employed in the business. A new system or a new machine is looked at askance by the very men for whose benefit the inventor has labored through many trials and experiments to accomplish a desired end.

Perhaps no trade is more dependent on thoroughness in its preparatory stages for successful finality than that of dyeing, a fact frequently lost sight of by men engaged in producing the many beautiful tints and shades extant. A very apt illustration of this occurred some time ago when a firm of dyers instituted proceedings against a well known firm of color manufacturers for supplying goods inferior to sample. Try how he would, the dyer could not obtain the clear, bright shade produced by a rival firm. The secret only came out after many fruitless experiments in the dye-house and finishing processes, when a comparison was made in the method of bleaching and preparing the fabric *before* it entered the dye-house.

With the above in mind, the writer has for some time past been collecting evidence and data from any and every source obtainable as to the best and most economical method of bleaching cotton fabrics preparatory to dyeing.

For aniline black dyeing what is known in the trade as a "gray boil and sour" are all that is necessary. This is usually termed "scouring" rather than bleaching. In small dye-houses this scouring is effected in a deep box dye jig. This method, although largely used by many firms, is about the most costly that could be employed, owing to the excessive amount of chemicals required and time taken up in the process.

For some five or six years past the trend of opinion has been in favor of bleaching cloth at full width instead of the rope method previously employed, but it has been demonstrated beyond a reasonable doubt that no full width process eliminates the size and other impurities from the cloth half so thoroughly as the "kier" bleach. In confirmation of this, a very eminent firm of buyers and finishers installed some four years ago an open bleach plant in their works at a cost of several thousand dollars, but at the end of last year reverted to their previous method of bleaching in rope form, with the latest form of high pressure kiers in place of the open or "puffer pipe" system. The manager of this firm discharged some of his best workmen during the time the open bleach was in use, because of the excessive percentage of D. and K. (damaged and kept pieces). He is now convinced that these men were not to blame, feeling sure that certain impurities, which should have been removed in the bleaching process, remained in the fabric by reason of the process employed. These impurities and foreign matter formed a resist to various colors in the dyebath, which, after passing over the drying machine stenter and calender, showed up in tiny spots or stains on the fabric, not being discovered until it reached the making-up room.

The two main arguments in favor of bleaching in the rope form, as against full width, are (a) that the constant twisting and untwisting of the fabric during the process of boiling, combined with the ever varying surfaces presented by the cloth to the rollers of the washing machines during its passage through the squeezing nips, constitute a cleansing agent unknown in the open system. (b) The chemicals employed in the full width bleach are necessarily more severe in their action on the fabric than is the case in the rope kier bleach. This frequently results in "tendering" the cloth and is responsible for a large increase in cost of chemicals and D. and K.

As a result of the writer's investigation of the subject, the following is recommended as a thorough and economical preparatory bleach for dyed goods of all shades and tints, exclusive of blacks and reds, which only need gray boil and sour. Singe over either a gas or a copper plate, wetting out at the singeing machine, direct therefrom through pot eyes and over winces into a high pressure kier (50 pounds sq. inch) for a three hours' boiling, thence into a washing machine charged with spirits of salts, 1½ to 2 degrees Tw., thence onto wooden stillage, remaining there from three to four hours to soak and drain off; then washing off through tandem machines, back over winces into H. P. kier for eight hours' boiling in caustic soda of two degrees Tw.; allowing the cloth to remain in the kier after caustic boiling. Then

run the liquor off, wash the cloth while in the kier by running clear spring water through for one hour, and draw through chemicing machine, charged at one per cent. Tw. Then stack the cloth for twelve hours on stillage, and then run through a washing machine into spirits of salts, at 1½ to 2 degrees Tw., to be piled on stillage for one hour. Afterwards wash until sweet, thence through squeezers into an automatic scutcher, which delivers the cloth into first-time mangle.

The above process works out at less than five cents per piece, 29 inches wide, 80 yards long, weighing 28 pounds, and may be absolutely relied upon to give the best results obtainable.

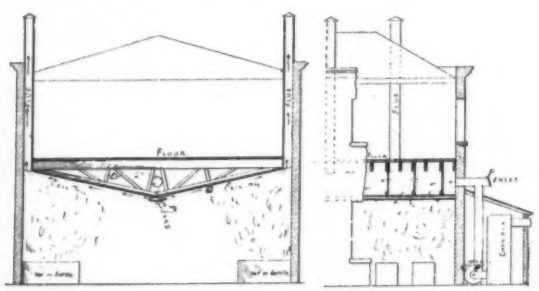
A new patent machine, combining both washing and chemicing in one process, (given as two distinct processes,) is at present undergoing trial in a large dye works in England.

VENTILATING DYE HOUSES OR BLEACHERIES.

The accompanying illustration shows certain means for ventilating dye houses or bleacheries. Fig. 1 is a cross section of the dye house or bleachery, and Fig. 2 is a longitudinal section of the house.

In dye houses and bleacheries, as usually constructed, great difficulty is experienced in properly ventilating them in cold weather when the rising vapors are condensed into a dense atmosphere of steam. Because of these conditions it is almost, if not quite impossible, to maintain the efficiency of labor conditions or secure even a fair working condition. This condensation of steam or vapor renders the atmosphere damp in cold weather, and the accumulations of damaging gases in bleacheries from the want of ventilation in cold weather, introduce conditions very detrimental to the workmen.

The object of the means here employed is to overcome these objections by providing a system of ventilation which shall cause all vapors and gases to be carried away as soon



as they rise, thereby maintaining the dye house or bleachery in a habitable condition at all times and under all variations of temperature.

In carrying out the scheme the dye house or bleachery is provided with a ceiling having one or more inclined surfaces communicating at their highest portions with chimneys extending sufficiently high to carry away the contaminated atmosphere.

The plan also comprises a hollow compartment above the ceiling through which air is caused to circulate and escape through apertures adjacent to the lower-most part of the inclined ceiling, whereby the air in rising along the under surface of the ceiling carries with it the ascending vapors and gases and conveys them to the ventilating chimneys.

The plan includes means to force the air through the compartment above the ceiling to more positively insure the circulation when desired.

The dyeing or bleaching room is provided with inclined ceilings, which communicate at their highest portions with ventilating flues of which there may be any desired number. The lower-most portions of the ceiling may receive a supply of warm or relatively non-humid air by an opening which extends the length of the ceiling. Guards may be arranged below the opening to deflect the air passing through the opening upward along the inclined ceilings.

One or more floors may be arranged in the building above the ceilings, and the intermediate chamber may inclose trussed girders which make the floor and ceiling substantial and self-sustaining.

The air passing into the chamber above the ceiling for distribution may be admitted direct from the atmosphere outside of the building by a controlled inlet and pipe, or it may be forced in by a blower and heated or otherwise prepared by passing through a chamber as desired. In this manner the ascending vapors and steam from the vats meet warm and relatively dry layers of air adjacent to the ceilings and are carried along thereby and up the chimneys or ventilating flues out of the building. It will thus be seen that the steam and vapors are not permitted to remain in the room, nor are they allowed to come in contact with a cold ceiling as heretofore. There is, therefore, no condensations within the room and the atmosphere is comparatively free from vapors, steam and gases, such as are commonly found in dye houses and bleacheries during cold weather.

It is evident, that while a double ceiling inclined in opposite directions as here shown, the same results will be secured if only a single inclination is given to the ceiling, such as if the building comprised only one half of what is shown.

BOILING KIERS.

[*The following article originally appeared in the Textile Mercury, Manchester, England, some time ago, and never seemed to have attracted the attention that it deserved, and for this reason we republish it in our columns as presenting good ideas concerning the kier process in bleaching.*

It will be observed that the writer is deeply interested in a pump circulation, which has many meritorious features, exemplified in a different and superior way by the Jefferson system of circulation (described in our September issue, page 338).

The author, however, presents many good points, one of which, favored by him, is the introduction of the liquor at the bottom of the kier, something that many old bleachers have not yet realized the value of, but one which it would be well for them to fully consider whenever they have an opportunity to do so. It is a question whether the recommendation of the author, favoring the submersion of the cloth, is a good one. Submersion has too much of the steeping effect, which has its demerits.

On the whole, the article is an excellent one, and well worth a careful perusal.]

In this article I purpose giving a description of the systems of boiling that I have worked and seen at work.

No doubt the first boilers or kiers used in bleaching or dyeing were on the same principle as the boiler in use today for family washing—heated by fire underneath. Like

everything else, this boiler has gone through a course of evolution, which has resulted in a variety of systems. The first users of this fire-heated boiler for bleaching or dyeing no doubt found great difficulty in what the washerwoman considers an advantage—namely, that the goods were loose and floating in the liquor, in which they might be moved about by a stick. This is all very well when one has only shirts and pocket-handkerchiefs in a small boiler; but in the case of a large boiler, and having to deal with great lengths of cloth and quantities of loose yarn, it is quite another matter. The floating of the goods would in such case cause a great amount of trouble, by their getting entangled. To avoid this inconvenience, more goods would be put in, and weights would be laid on to keep them under the liquor. Also, to assist the circulation, the "puffer pipe" was put in, and up this the liquor would be forced by its expansion as it became heated. I cannot find out when or where the puffer pipe was first used, but I have no doubt its intention was to assist the circulation.

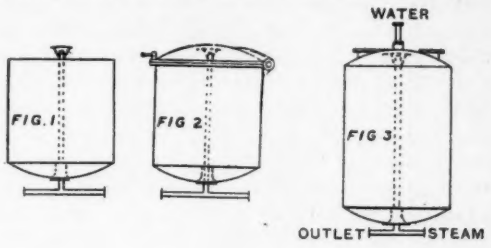
I can remember very well when quite a youngster seeing two of these boilers or kiers at work in a place near Manchester, Eng., nearly 45 years ago. It was a cold, winter day (too cold to be outside), and my companion and I stood before the fire of one of these kiers, while the other kier was being unloaded. When the men began to unload, I wondered at the great quantity of iron bars they took out before they came to the goods, and I was so astonished at this that I asked my father why they "boiled so much iron!" He explained to me that all the iron I saw was required to keep the goods under the liquor. These were open kiers, and with this exception were, in my opinion, very much akin to the kier of to-day, heated with coils (Fig. 6).

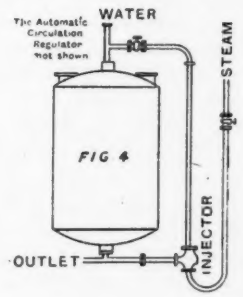
The first kier I had to do with was the open kier (Fig. 1), with the puffer pipe in the centre, up which the liquor was forced by the steam. The same kier is still in very extended use today in Lancashire, and is considered by many to be the only kier that can turn out a good white. Nevertheless I believe its retention is, in nine cases out of ten, due to nothing more or less than an obstinate adherence to old things, and a belief that because a thing has been in use so long it must be better than anything new. I admit that open—or, rather, low-pressure—kiers are necessary for fine muslins and fancy colored linings. But it is hardly necessary to keep an open kier for this purpose, because a kier like Fig. 5 will do exactly the same work if the manholes be left open. Later I will describe the working of the two systems.

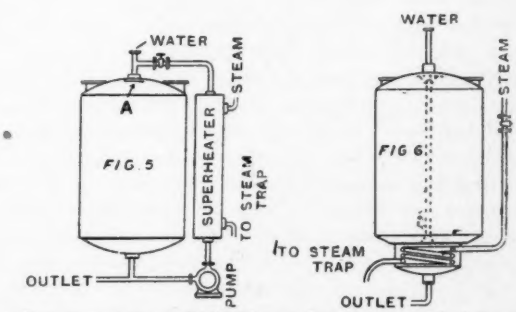
The next kier I had to do with was the low-pressure kier shown in Fig. 2. The lid worked on hinges, and was lifted by a chain. This lid fitted in a groove in which was packing, which enabled us to get about four pounds pressure. The great drawback with this was the rising of the goods; and to prevent this we were obliged to have pieces of angle-iron fixed to the lids of the kier, the flanges of which kept strong iron bars in position across the goods. The advantage gained by the few pounds of pressure was lost by having to use the means we did to keep the goods in the liquor.

I had next to do with a kier known at the time as the "Pendlebury," which is identical in principle with the "Barlow" kier. The only difference was that the latter consisted of a pair of high-pressure kiers of equal size, both being filled with cloth, and the liquor being forced by the pressure of the steam through the goods from one kier to the other alternately; whereas in the "Pendlebury" kier there was only one large kier fitted with cloth (about 3¼ tons capacity) and one of almost quarter the size for the liquor. The liquor was forced by the pressure of the steam from the small one into the large one, through the goods, and into the small again; and thus the operation went on for several hours. It is questionable whether either of these two systems was an improvement on the open kier.

Fig. 3 is a sketch of a kier I had made about twenty-eight years ago, to take the place of a "Pendlebury" kier. It certainly turned out better work, and consequently I changed some others of the "Pendlebury" type to this.







The change was most decidedly an improvement, but I was not altogether satisfied, as I believed there was still room for improvement. About this time I visited England often, and was always on the lookout for some improvement in boiling.

The next change was to the injector, with automatic circulation regulator (Fig. 4). I gave the system a fair trial, but it was too erratic and uncertain and irregular with its work; and, as there was no advantage over the kier shown in Fig. 3, I discarded them, and continued as before.

In 1885 I arranged my first kier with the centrifugal pump and superheater (Fig. 5). The result gave so much satisfaction that I changed all the kiers, and was able to give up the lime for the caustic bleach. The change was

not found out by the finisher—an Englishman—who for obstinate conservatism would be difficult to surpass; and had he not been told he would never have noticed the change. The white was equal to the lime bleach, the saving in coal and acid was remarkable, and I was at the same time enabled to increase the output by one-third, in the same space, with the same machinery, and the same number of workpeople! The reduction in damaged cloths, too, was also worth a consideration. Perceiving that this was the most practical system of boiling I had tried, I made several experiments to ascertain what was the most suitable pressure. From these it appeared that from 10 to 15 pounds gave the best result, whereas the simple high-pressure kier (Fig. 3), the injector kier (Fig. 4), or the coil-heated kier (Fig. 6), must be worked at not less than 40 pounds pressure if they are to give satisfaction. It is not good for either yarn or cloth to be boiled at too great a pressure; the higher the pressure the more the goods become compressed, and the greater is the resistance they offer to the liquor. There is no necessity to work higher than 15 pounds.

We read in "The Chemistry and Practice of Finishing," page 64, that Dr. Schunck found in raw cotton (among other substances) a wax which he called "cotton wax," having a melting point over 186 deg. F. He also obtained a white solid fatty acid, having a melting point at 132 deg. F.; two distinct coloring matters, one soluble and the other insoluble in alcohol; pectic acid, and albuminous matters. "Most of these substances are practically insoluble in water, and on this account the principal process in bleaching consists of operations designed to remove the resinous, oily, and waxy matters. These protect the coloring matter of the cotton from the action of the chlorine used in the latter stages of bleaching."

There is nothing naturally found in the cotton fiber, nor in the substances introduced in the course of manufacture, that will remain insoluble after being subjected to the action of the soda lye for several hours in the kier under consideration, working at 15 pounds pressure—that is, if the kier be loaded and worked properly. A great proportion of these resinous and waxy substances is dissolved by the soda lye and carried away with it, and the remainder is so loosened that it is easily removed by washing, chemicing, and souring, provided that the circulation has been equal and abundant. I have no doubt many bleachers will have noticed a greasy, gummy substance adhering to the side of the spreader or "drainer," over the chemic and sour cisterns. This greasy, gummy substance has not been made entirely soluble by the soda lye; it has been only loosened, more or less; and owing to bad circulation it was not able to mix with and be carried away with the boiling liquor and subsequent washing. Hence the necessity of having a kier that gives a free and an abundant circulation throughout the whole mass of goods; this is why the open kier has been able to hold its place so long, notwithstanding its extravagance in chemicals, coal, and labor. When an open kier is not overloaded, when the cloth is evenly plaited, and the proper quantity of liquor is provided, while the goods are not unduly compressed, the circulation is fairly good.

What, then, it may be asked, is the difference between the open kier (Fig. 1) and the kier shown in Fig. 5? In the first instance, the liquor drains through the goods, collects below the false bottom, and is then forced up the puffer pipe and spread on the goods by the bonnet. This action is intermittent, because after each ejection of the liquor the force of the steam must accumulate before it can overcome the column of liquor in the puffer pipe; and as the steam is continually mixing with the liquor, the latter naturally becomes weaker, and (being exposed) can never become so hot by many degrees as in a closed kier. In Fig. 5 the liquor drains through the goods and the false bottom; and as the pump is placed below the bottom of the kier, it takes up the liquor as it collects and propels it through the superheater (where it is reheated) to the top of the kier on to spreader A. By this system of boiling we have no live steam entering the kier; therefore the liquor does not become weaker, and (as just stated) it becomes much hotter than in the open kier, and better able to dissolve those substances that protect the coloring matter of the cotton. No weights are required to keep the goods down; and as the pump is only a simple-acting centrifugal pump, there is no suction, and therefore no undue pressure on the goods. Consequently the circulation is constant, free, and equal all over the goods—that is, if the kier has been properly loaded. It must be obvious to any practical observer that this kier has all the features of good circulation—and good circulation means a good white free from stains.

(*To be Continued.*)

A NEW DYEING MACHINE.

The object of the dyeing machine, herewith illustrated, is to provide a simple and efficient method whereby the material to be dyed may be thoroughly subjected to the dyeing liquid and expeditiously removed from the machine. Figure 1 is a vertical section of the machine, showing by dotted lines the receptacle for the material to be dyed, moved out of the tank, and in position to dump its contents. Fugures 2 and 3 are sectional details of the valves for controlling the flow of the dyeing liquid. As will be seen, the tank is open at its top, and the receptacle is of the same shape as the interior of the tank, but of slightly smaller dimensions.

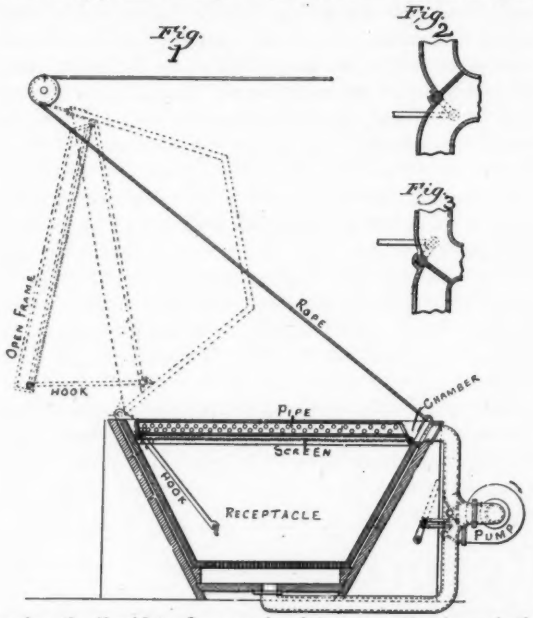
Extending over the top of the receptacle, a slight distance below the top, is an open frame which is hinged at one of its ends to the receptacle. This frame carries a screen, which extends entirely over the receptacle; and arranged above the screen, and extending down through the central portion of the receptacle, is a pipe, which is secured to and carried by the frame. One end of the pipe opens into the chamber, and the opposite end of the pipe is closed. The side walls of the pipe are provided with perforations which gradually increase in number from the end of the pipe communicating with the chamber to the opposite end thereof. Thus it will be seen that if the dyeing liquid be introduced to the chamber, the liquid will flow through the pipe and out through the perforations therein into the receptacle, the gradually increasing number of perforations insuring an equal distribution of the dyeing liquid to the receptacle.

The bottom of the receptacle is provided with perforations to permit the dyeing liquid to flow vertically through the receptacle and tank. Extending around the interior of the tank, a slight distance above the bottom is a ledge, upon which the receptacle rests when it is within the tank. The purpose of this ledge is to support the receptacle within the tank, and provide a space below it into which the dyeing liquid may be forced and caused to flow up through

the engagement of the receptacle with the ledge preventing the flow of the liquid up through the tank exteriorly of the receptacle.

There is a rotary pump having an inlet opening and a discharge opening.

When the parts occupy the position shown in the drawings, and the pump is driven in the direction indicated by the arrow, the dyeing liquid will be drawn by the pump from the bottom of the tank through the pipes and discharged through other pipes into the chamber, from which it will flow through a pipe, from which it is distributed throughout the upper portion of the receptacle. Thus it will be seen that during the operation of the pump, the dyeing liquid will be caused to circulate and flow downwardly through the receptacle. When, however, the valves are reversed, the dyeing liquid will be drawn by the pump from the pipe and chamber into the bottom of the tank, thus



causing the liquid to flow or circulate upwardly through the receptacle. Thus it will be seen that the contents of the receptacle may be thoroughly subjected to the dyeing liquid.

When it is desired to remove the dyed material from the receptacle, the frame is raised and the hook is engaged with a pin. The receptacle is then moved from within the tank to the position shown by dotted lines in Fig. 1, to dump its contents. As the receptacle leaves the tank, the dyeing liquid flows out of the receptacle and into the tank through the perforations in the bottom.

APPARATUS FOR DYEING YARN COPS.

The accompanying illustrations show an apparatus for dyeing yarn in a conical cop. Fig. 1 is a vertical central section of the apparatus; Fig. 2 is a cross section of Fig. 1, on line xx, with the enclosing cover removed.

The operation of the apparatus is as follows: The valve in the inlet pipe for inflow of dye fluid being opened and the discharge valve being properly adjusted to provide for a flow through it which will give the proper pressure in the vessel, the pump is started and dye fluid is supplied to chamber O, thence it is forced downwardly through the conical cop into chamber N, also through perforations in the perforated cone radially through this cone and thus into chamber N and space M and through the discharge pipe, leaving the mordant of the dye evenly distributed in the yarn cop. By this apparatus a perfectly even result is always obtained.

The originality of the idea comes in using the peculiar taper shape of the yarn cop in conjunction with the reversed taper of the iron flask to form a tight joint without the use of outside packing material as in other machines. The more pressure applied producing a corresponding

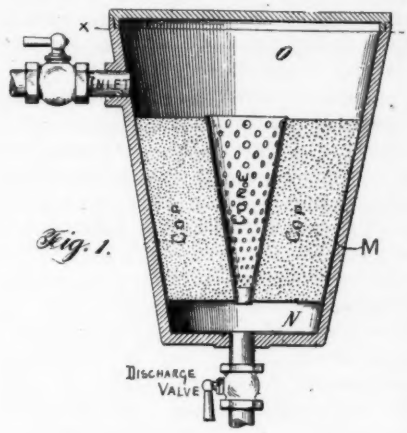


Fig. 1.

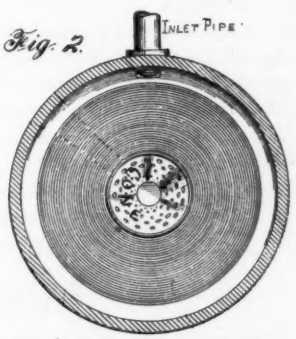


Fig. 2.

tighter plug and obliging the dye liquor to penetrate the yarn itself with no openings or voids around the cop to waste the pressure and allow the dye liquor to pass outside the yarn cop, and this cop is also preserved in its cylindrical form without distortion or disarrangement of the wind.

In practice, several or many flasks are connected up in series by suitable connecting pipes allowing a considerable quantity of yarn to be treated or dyed at one time.

The peculiar breaking away of the cuticle of the cotton fiber under the action of cuprammonium has been described by Wiesner; the protoplasmic inner wall, like the cuticle, also resists the solvent action of the reagent.

Over 225,000 operatives are employed in the textile works of Saxony. The number of operatives engaged in the manufacture of textiles in and near Chemnitz is estimated at 70,000, divided among 1,522 factories.

When the mercerized fiber is dyed with a substantive dyestuff, the cellulose itself is deeply colored, and on treatment with cuprammonium shows a strongly colored cuticle and lumen, and only a slightly colored cellulose.

NATURAL VS. ARTIFICIAL INDIGO.

DAVID PATERSON.

The interest this subject arouses from time to time indicates that chemists as well as dyers are now fully aware of its importance and of the great issues at stake for the indigo plantations in India. Too much has been written in a strain which implied that the natural indigo was already superseded by the artificial and that it was merely a question of a little time when the whole indigo industry of India would be a thing of the past. Reasoning from the precedent of the madder plant and artificial alizarin, it is, of course, natural to come to such a conclusion; but happily such a pessimistic prophecy is as yet far from fulfillment. There is a good future for natural indigo yet, and if proper steps be taken to preserve the trade by legislative measures, by suitable advertising, and by adopting the valuable results of the research work now being done, there is undoubtedly a brighter prospect for the natural indigo than there has been for many years.

The whole question in a nutshell is whether the natural or the artificial dyes the better and the cheaper color. The continued existence of the indigo plantations stands solely upon the answer to this question. If the artificial product gives undoubtedly cheaper and better all-round results, then let it be frankly admitted. If, on the other hand, the natural indigo proves itself, after careful and unbiased trial by competent practical dyers, to give better value for the money, then by all means stick to it.

The idea that a natural mordant, or dye "assistant," is present in the natural indigo has been contested by many chemists. Indeed just recently two leading chemists in England have expressed their doubt as to the truth of this alleged dyeing superiority of the natural indigo over the artificial indigotin. In 1905 the writer drew attention to the fact that this so-called "mythical mordant" was a reality, and maintained that "there is some organic body present in the natural indigo which facilitates the dyeing and acts something after the nature of a mordant." This was written after a series of experiments had been made on the dyeing qualities of the two dyestuffs.

It is therefore very gratifying to see that Mr. Bergtheil, bacteriologist to the Bengal Government, has lately been conducting dyeing experiments on the practical scale at the Cawnpore Woolen Mills, and that the results obtained were decidedly in favor of the natural indigo. To one or more of the so-called "impurities" in the plant indigo, viz. the indigo red, the gluten, or the indigo brown matters, has been attributed to the superior dyeing qualities of indigo. The researches of Schwarzenberg and Schwartz on this subject, many years ago, refuted this idea, and showed that neither of these constituents was of any value whatever in the dye vat. This conclusion seems to be a mistake. The indigo brown is certainly of no value in the dyeing, but the indigo red and the indigo gluten are both of use in the vat dyeing. The red, I find, does not act as an "assistant," or mordant, as some writers think, but simply as a tone producer; but the gluten does most assuredly produce the superior dyeing results. It acts as a mild mordant—more noticeable in the reep navy blue shades,—and produces that purplish or reddish "bloom" that is a point of beauty with indigo dyers. The makers of the synthetic product are evidently aware of this fact, and recommend the addition of glue of turkey-red oil to the dyeing process when using "indigotin pure." Further, I have observed that the gluten fixes the coloring matter more firmly on the fiber of both wool and cotton. Not so much blue is washed off where the natural indigo with its gluten has been used, and this should also affect the "rubbing" qualities. This, then, seems to be the secret of the superior dyeing powers of the natural indigo over the indigotin pure.

Market Reports.

THE KNIT GOODS MARKET.

Notwithstanding the disturbances that have occurred in the money market during the last month, there is manifested considerable strength in the knit goods market, especially for spot deliveries. This is due to the fact that buyers have made their appearance in the market for new supplies of seasonable goods, which they find difficult, if not impossible, to secure in the styles and quantities desired. Medium weight fabrics, suitable for cold weather, are not to be had in any considerable quantity, which places the seller in an excellent position to demand a price that will carry a profit, which the buyers do not hesitate in meeting, and in some cases are willing to pay a premium in order to get the goods in sufficient quantity to meet winter wants. This demand applies not only to underwear but to hosiery.

Spring requirements, however,have a slightly different status, and buyers are showing but little disposition to operate to any extent for meeting their future requirements. Whatever is done is done slowly and conservatively, and even where the goods are wanted in order to meet anticipated demands, the stringency in the money market deters many from operating with confidence.

On next fall lines there is a positive standstill, and manufacturers are acting upon what they consider to be their interests to withhold from view their new lines until later in the year or until the first part of next year. The situation is governed more by the status of the money market than anything else, as there is no large quantity of knit goods, either underwear or hosiery, in the distributing centers of the country, and not sufficient to meet ordinary demands. There is a decided shortage in the supply, and all that is really required is the return of normal conditions in trade and the restoration of confidence on the part of consumers. There is an absolute deficiency of gauze hosiery, laces, fancy effects, etc., for the coming season, and the same pertains to underwear at popular prices.

An important meeting occurred last month of the New York State Knit Goods Manufacturers' Association, in Albany, N. Y., at which time resolutions were adopted recommending that the openings of new fall lines be delayed until the situation in the financial, and cotton and yarn markets become more settled. A letter containing this recommendation has been sent to each member of the association, and to other underwear manufacturers. Another

meeting to consider the same subject will be held some time this month. It was the concensus of opinion of those present that no good can come from endeavoring to force buyers to purchase fall goods with the market in its present condition.

The National Hosiery Manufacturers' Association has sent a letter to its members, insisting upon the net weight basis in making future purchases of yarn manufacturers, the same as was brought to the attention of the Southern Soft Yarn Spinners' Association at its recent meeting in Atlanta, Ga., but which was not acted upon favorably by this latter association. The hosiery manufacturers, however, do not propose to let the matter drop, as noted in the following letter to the members of the association:

"The question as to the loss to the knitters by reason of the 2 per cent allowance for cones, not covering the weight of same, and no allowance whatever for wrapping paper, which often comes in large and heavy amounts, is an old, old question—one that the association has agitated ever since it was organized. Up to this time conditions have not appeared favorable for the accomplishment of our purpose, but we are pleased to state that at a meeting of our officers and executive committee steps have been taken and plans formulated, which means that by firmness and by more or less concerted action the knitters may be enabled to purchase their future yarn requirements upon a net weight basis, which will mean many thousands of dollars benefit to them. We are not prepared just yet to give you full particulars of the course of procedure, but would state in partial explanation that many of the hosiery manufacturers are now purchasing most of their yarns on a net weight basis, and there is no reason why our other members should not also enjoy these benefits, for it is recognized by every hosiery manufacturer who has investigated the question that under the old plan of buying yarn there is an absolute loss of from 1 to 9 per cent on every case of yarn purchased. It will require very little figuring for you to estimate your savings, provided we can bring about the object sought. At this time we ask that on all future yarn contracts you insist upon purchasing upon a net weight basis, even though the spinner or commission men should insist upon a slight advance in price. What we must and will accomplish is to bring about a uniformity as to the method of purchasing. The question of price will naturally adjust itself."

SOUTHERN COTTON YARN MARKET.

There has been no activity shown in the cotton yarn market during the last month, but everything has been in a most unsettled state in which buyers have taken but little interest, because of their expectation of seeing prices at a much lower level consistent with the general trend of prices on other commodities, resulting in very little actual business being done.

The stringency in the money market has had its detrimental effect upon all new trade, and has seriously affected contracts for yarns, even in cases where there is a disposition for their fullfillment on the part of buyers. There is hope that the recent action on the part of the Southern spinners for the curtailment of production will have a beneficial effect upon prices in holding them more steady and confining the supply more within the limits of demand.

Quotations are unsatisfactory because of so many weak spots where holders are willing to part with their stock at prices less than the quotations, the consequence being that prices are very irregular, and vary in some cases as much as two cents per pound. The quotations, therefore, given below are not intended to be more than approximate and tentative.

The yarn dealer is now more interested in the disposition of yarns that have already been contracted for and ready for delivery rather than the taking of any new orders, which are sparingly given.

An important meeting was held of the Hard Yarn Spinners' Association at Charlotte, N. C., on the 7th of last month, when a curtailment of one-third was officially decided upon by the members present, the agreement adopted being as follows:

"That the hard yarn spinners of the Southern States agree and bind themselves to curtail their production at least one-third from Nov. 11, 1907, to Jan. 1, 1908."

All present signed this agreement. As the members present represented three-quarters of a million spindles the meaning of the agreement will be better understood.

We quote as follows:

SOUTHERN TWO-PLY SKEINS.

4s to 8s	17 @18	30s	23 @..
10s to 12s	18 @..	36s	32 @..
14s	18 @..	40s	33 @34
16s	19 @..	50s	49 @..
20s	19½@..	60s	61 @..
24s	21½@..	3-ply 8s upholstery	18 @..
26s	22 @..	4-ply 9s upholstery	18 @..

SOUTHERN SINGLE SKEINS.

4s to 8s	17 @..	22s	21 @..
10s to 12s	17½@18	26s	22 @..
14s to 16s	18 @19½	30s	23 @24
20s	20 @..		

SOUTHERN SINGLE CHAIN WARPS.

8s to 10s	17 @17½	22s	2 @..
12s	17½@18	26s	23 @..
14s	18 @18½	30s	24 @..
16s	19 @..	40s	33 @..
20s	20 @..		

SOUTHERN TWO-PLY CHAIN WARPS, ETC.

8s to 10s 2-ply	18 @19	26s 2-ply	22½@23
12s to 14s 2-ply	18½@19	30s 2-ply	22 @23
16s	19½@..	40s 2-ply	35 @..
20s 2-ply	19½@20	50s 2-ply	36 @..
24s 2-ply	22 @..		

SOUTHERN FRAME PEELER CONES.

8s	19 @..	20s	22 @..
10s	19½@..	22s	22½@..
11s	19¾@..	24s	23½@..
12s	20 @..	26s	24½@..
14s	20¼@..	30s	25½@..
16s	21 @..	40s	34 @35
18s	21¾@..		

SOUTHERN COTTON MILL STOCKS.

QUOTATIONS BY F. C. ABBOTT & CO.

	Bid.	Asked.		Bid.	Asked.
Aiken Mfg. Co.	91½	92½	Florence, N. C.	135	140
American Spinning, pfd.	100	104	Gaffney Mfg. Co.	91	93
Arkwright Mills	112	116	Gaston	110	—
Arlington	160	—	Gainesville	50	67
Avon	115	—	Gibson	100	101
Avondale	125	—	Graniteville, S. C.	160	156
Augusta, Ga.	73	77	Gray Mfg. Co.	125	—
Bonnie	125	—	Grendel	118	124
Bloomfield	109	—	Greenwood	97	—
Brandon Cotton Mills	134	—	Highland Park	160	—
Brookside	105	109	Hartsville, pref	100	—
Capitol City, pref.	90	96	Hartsville	107	—
Chadwick, N. C., pref.	100	101	Inman Mills, S. C., pref.	97	—
Chadwick, N. C., com.	120	130	Kesler	135	—
Clara	130	—	Jno. P. King Mfg. Co.	99	101
Clover	150	—	Lancaster, com	115	—
Clinton	155	—	Lanett	110	111
Cox	110	—	Langley Mfg. Co.	96	—
Clinton, pref	100	—	Linden, N. C.	125	—
Cliffside	160	201	Limestone	140	151
Chiquola Cot. Mills	125	—	Loray, pref., 1901	103	—
Cherokee Mfg. Co.	150	—	Lowell	190	—
Converse	112	117	Mooresville, N. C.	125	135
Dallas Mfg. Co., Ala.	96	101	Lumberton	215	—
Dover Yarn Mills, N. C.	100	—	Mills Mfg. Co., pref.	105	—
Dillon	85	100	Modena Mills	130	—
Efird, N. C.	135	—	Mollohon	110	—
Elmira, pfd	100	101	Monarch, S. C.	107	110
Eagle & Phoenix	132	—	Newberry	120	—
Easley	130	—	Nakomis, N. C.	150	—
Edenton, N. C.	140	—	Olympia, 1st	70	71
Exposition	225	—	Ozark	170	176
Fairfield	80	84½	Patterson	130	140

	Bid.	Asked.
Piedmont Mfg. Co	172	—
Pelzer	169	—
Pelham, Ga., com	161	200
Pell City, pref	100	—
Raleigh	99	—
Richmond Spinning Co	90	—
Rocky River	115	—
Saxon	124	126
Sibley, Ga	61	65
Social Circle	100	106
Spartan Mills	146	153½
Springstein	90	—
Statesville Cot. Mills	102	—
Trenton, N. C	160	—
Tryon, N. C	121	142
Tuscarora	115	—
Tucapau, S. C	200	—
Toxaway	94	100
Union Buffalo, 1st pfd	72	—
Union Buffalo, 2nd pref	24	28
Union Buffalo, com	10	—
Victor Mills, S. C	130	—
Warren Mfg. Co	92	95½
Washington Mills	25	—
Washington Mills, pfd	111	116
Watts	118	121
Ware Shoals	96	101
Wiscassett	135	—
Whitney	150	—
Woodside	110	113
Woodruff	130	—
Williamston	109	—

NEW ENGLAND MILL STOCKS.

	Asked.	Sales.
American Linen Co	105	102½
Cornell Mills	160	150
Flint Mills	110	100
Laurel Lake Mills	127½	125
Mechanics' Mills	102½	100
Weetamoe Mills	95	92½
Nonquitt Spinning Co	—	90
Pierce Mfg. Co	—	308
Soule Mill	—	125
Amory	—	176½
Amoskeag Mfg. Co. (n.st)	—	245
Arlington Mills	—	135
Appleton Co.	—	130¼
Boston Mfg. Co. (new)	—	46½
Boston Duck Co	—	1325
Boott Cotton Mills	—	25¼
Cabot Cotton Mills	—	75½
Cocheco (N. H.)	—	205
Chicopee Mfg. Co	—	95
Continental Mills	—	62
Dwight (Mass.)	—	1177½
Edwards	—	116
Essex Co	—	135
Everett (Mass.)	—	130
Fisher Mfg. Co	—	106
Naumkeag Steam Cotton	—	76
New Eng. Cot. Yarn, pf.	—	86¼
Newmarket Mfg. Co	—	130
Newmarket Mfg. Co. (n)	—	20¼
Nashua	—	700
Osborn Mills	—	100
Otis Mfg. Co	—	1852½
Pacific (Mass.)	—	2600
Pepperell (Me.)	—	300

New Machinery and Trade Notes.

FARBENFABRIKEN OF ELBERFELD COMPANY, NEW YORK.

This company has issued a number of color cards showing recent dyes for cotton, as follows:

Katigen Yellow Brown R Extra, well adapted for the production of brilliant brown shades on loose cotton, yarns and prices. It can also be advantageously employed as a combination dyestuff for producing the various fancy olive and other shades by reason of its good level dye property.

Katigen Black 2R Extra, distinguished for its fine reddish tone and good solubility, and can be employed for self shades of reddish blacks or as a combination color for shading greenish blacks to the red shade. It can be recommended for cotton goods where particular fastness is required, and is especially suited for machine dyeing.

Katigen Deep Black B, is the first brand of a new group of Katigen Blacks, producing very fine bluish black, possessed of excellent qualities for the dyeing of loose cotton, yarns and piece goods, and is well adapted for dyeing cops and cheeses in machines.

Katigen Yellow Brown O Extra, is a new yellowish brown Katigen dyestuff, remarkable on account of its great productiveness and depth of shade, and is especially well adapted for the production of brilliant tan, bronze and brown shades.

Katigen Indigo CLG Extra, is a new sulphide color, and is used like other Katigen Indigo colors, and can be recommended for dyeing of self shades of bright Indigo tones, or as a combination color for the shading of reddish Katigen Indigo brands to the green side. It is particularly valued for the dyeing of loose cotton and yarns, for fancy woven goods, shirting, ticking, blouses, etc., as well as for piece goods for which particular fastness is demanded.

Chloramine Yellow RC, is a new yellow dyestuff well adapted as a shading color for the dyeing of loose cotton, yarns and piece goods.

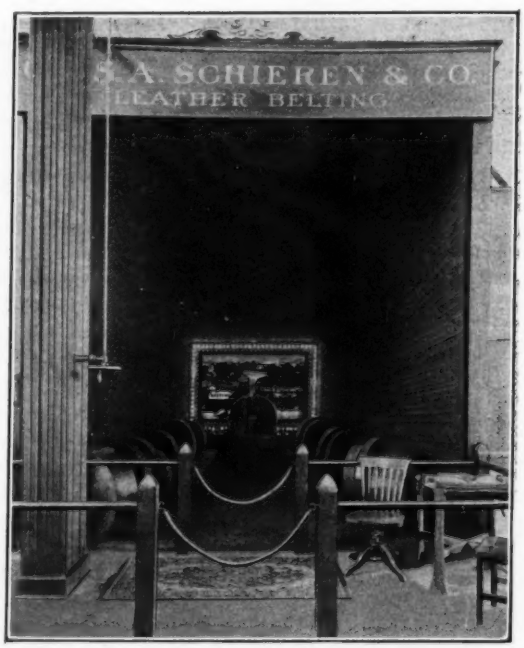
Algole Green B Paste, is a color of a new category of dyestuff, used in the hydrosulphite vat, and is remarkable for its fastness to light, washing, boiling, cross dyeing, alkalies and acids, and is well adapted for the dyeing of yarns for fancy woven goods.

Brilliant Fast Blue 2G, is an additional brand to the series of brilliant fast blues which are distinguished for their fastness to light and brilliance of shade.

DRAPER LOOMS. The Massachusetts Mills, Lowell, Mass., are installing 600 Draper looms to supplant some old looms.

WATERPROOF AND STEAMPROOF LEATHER BELTING.

Waterproof and steamproof leather belting was exhibited for the first time in history at the Jamestown Exposition. Charles A. Schieren & Co., New York, have received a gold medal, the highest award, from the exposition company, for their "Duxbak" leather belting on the distinct claim that it is a waterproof and steamproof belting. Charles A. Schieren & Co., have been perfecting their waterproof belting for several years but never until about a year or two ago was it advertised under a trade mark name and with the distinct claim that it was waterproof and steamproof. They claim that a distinct and important step forward has been taken in the making of leather belting in their "Duxbak" process.



The exhibit of the Schieren Company at Jamestown, shown in the accompanying illustration, was a beautifully painted glass picture representing a lake, out of which flowed a real waterfall upon a roll of "Duxbak" belting. The exhibit was designed on the lines of an interior view of a camera. From the front of the booth black cloth was

draped artistically on the two sides and top to the rear of the booth, throwing the brilliantly lighted picture out into bold relief. The size and significance of this display can best be realized when it is known that the big roll of "Duxbak" belting was eight inches in width and forty-two inches in height. The rear of the plate of glass and the frame were illuminated with 148 electric lights. Appearing and disappearing signs occupied either side of the display. On one side the "Duxbak" trade mark appeared, followed on the other side by the words, "Chas. A. Schieren & Co., New York."

The water fell from a fissure in the glass so naturally that it appeared as if it were a natural waterfall from the lake itself. It drenched the entire surface of the belt coil, and the pond formed by the overflow covered the bottom part of the coil to the depth of eight inches. Notwithstanding the fact that the belt was soaked all day long in this depth of water in the tank, it was perfectly dry and flexible when the water was turned off at night and the tank drained.

PROVIDENCE MILLS MANUFACTURING CO., Philadelphia, Pa. There has been a complete reorganization of this company, under an entirely new management, and it is prepared to give the best and promptest attention both as to quality of work produced and delivery of same. This company is particularly well fitted for bleaching, owing to excellent water facilities, the city of Philadelphia having installed the most modern system of filtration known, thereby enabling the company to have a large supply of good, clear water for the purpose. The company is specially fitted up for the mangling and calendering of cotton damasks, giving them the linen finish so much desired. The location of the company's establishment is easy of access for the receiving and shipping of goods from all sections of the country.

THE STAFFORD COMPANY, Readville, Mass. Among the orders recently closed for the "Ideal" automatic looms made by this company was one from the Pee Dee Manufacturing Company, of Rockingham, N. C., for 96 looms. This order was placed after a test of twelve looms which proved so eminently satisfactory that as many more were ordered as the mill could at present accommodate. These looms are of the three-harness type, equipped with overhead roller motion and pick finder for making drills, without any waste, and are the very latest and most improved style of loom manufactured by this company.

THE BADISCHE COMPANY, 128 Duane street, New York City. This company has the sole sale of the products of the Badische Aniline & Soda Fabrik in the United States and Canada. The president of this company is Adolf Kuttroff, who is also connected with the Continental Color and Chemical Company.

MASON MACHINE WORKS, Taunton, Mass. The St. Pauls Cotton Mills Company, St. Pauls, N. C., has awarded contracts to the Mason Machine Works, through its representative at Charlotte, for the mechanical equipment of the mills to be erected. The plant will consist of 5,000 spindles and complimentary apparatus for the manufacture of cotton yarn.

THE STANDARD SEWING MACHINE COMPANY, represented by W. H. Sharp, at its Southern office, Broad street, Atlanta, Ga., is placing upon the market a new mill sewing machine. The encouragement already received promises a large number of orders. Full particulars regarding its many advantages will be furnished to any mill preparing to increase its equipment.

E. E. ASPINWALL, who is well known to the textile trade, is now with the Arabol Manufacturing Company, 100 William street, New York. He represents that popular concern in the East and the Middle West.

There appears to be little doubt that Thomas and Prevost advanced mercerization beyond Lowe's observations, inasmuch as they perceived and realized at least some of the industrial applications mercerizing might be adapted to.

Color is a study of the utmost value to the student of textiles; in fact, it is one of the most important, and yet one of the most neglected in most schools.

In all classes of cotton combing machines the waste is collected at the back of the machine, being removed from the cylinder by means of a brush which is in turn acted upon by a doffer.

During recent years a comparatively large amount of attention has been expended upon the construction of combing machines, with the result that several notable improvements have been made.

The outer wall of cotton is covered with a waxy substance, cutin (cuticular cellulose), whilst dried-up residues of protoplasm coat the wall of the central canal.

Cotton wilt, often called black-root, is one of the most serious diseases of the crop wherever it occurs. It is characterized by the death of the plants in gradually enlarging spots in the field, where the disease reappears year after year.

The best Sea Island staple has a gloss or luster which adds greatly to its beauty and is indispensable for certain kinds of fabrics.

Send notice of Overseer changes to COTTON.

MILL NEWS.

Notices of mill projects, additions or improvements are solicited for this department.

ALABAMA.

HUNTSVILLE: The Huntsville Bagging Company has been incorporated with capital of $150,000 for the manufacture of jute bagging.

ARKANSAS.

LITTLE ROCK: Fred A. Cumnock, manager of the Perrin Cotton Mills, Celeste, Texas, is contemplating the organization of a company to erect a cotton mill at Little Rock, Ark.

CONNECTICUT.

FAIRFIELD: The Eastern Underwear Manufacturing Company has nearly completed its new factory of 60 by 135 feet, for the manufacture of ladies' underwear and corsets. It will give employment to some 200 girls.

MOOSUP: The Cranska Floyd Cotton Mill has made additions to its plant so that its main mill has a total frontage of 350 feet. A number of spinning frames have been installed, also some Universal doubling or winding machines.

WILLIMANTIC: The American Thread Company has started big improvements which will include the substitution of electrical and steam power for water power. The company is also building another big mill, to be known as Mill No. 6.

GEORGIA.

ALBANY: The Albany Business League is to organize a company, with capital of $25,000, for the erection of a cotton yarn mill, 10,000 spindles and accompanying machinery, to be operated by electricity. Local subscriptions to this end has been secured to the amount of $175,000. J. W. Mock can furnish information.

ASHBURN: J. S. Shingler and associates of this place are to organize a company with a capital of $250,000 to build a cotton mill.

CLARKSVILLE: The Board of Trade of this place would be interested in any substantial scheme for the establishment of a cotton mill in this location.

GRIFFIN: The Cherokee Mills have decided upon the installation of 10,000 ring spindles and necessary looms. J. J. Mangham is president.

SENOIA: H. P. Redwine is interested in the organization of a company with a capital of $100,000 for the erection of a cotton yarn spinning mill.

THOMSON: The John E. Smith Cotton Manufacturing Company is to enlarge its mill for the installation of 6,000 spindles and 200 looms, involving an expenditure of about $100,000.

MASSACHUSETTS.

FALL RIVER: The Kerr Mills of the American Thread Company will double the size of their plant in the new mill now being erected.

FALL RIVER: The Merchant's Manufacturing Company proposes to increase its capital stock.

HINGHAM: The Hingham Knitting Company has been incorporated with capital of $12,000, to manufacture textile fabrics. George Price is president.

MISSISSIPPI.

WINONA. The Winona Cotton Mills are to expend $12,000 for new machinery to increase their manufacturing facilities.

NEW HAMPSHIRE.

LACONIA: William Clow & Son have incorporated with capital of $50,000 to manufacture hosiery, yarns, and fabrics. This corporation takes over the business conducted at this place under the same name.

LOCKPORT: The Lockport Cotton Batting Company has been incorporated with a capital of $150,000 to manufacture cotton batting, etc. E. W. Rogers is one of the incorporators.

NORTH CAROLINA.

BURLINGTON: L. Strous, of this place, is interested in the establishment of a plant for the manufacture of felt from waste and trimmings of cotton spinning and hosiery knitting mills.

BURLINGTON: The Sellers Hosiery Mills of this place is to erect a building 40x80 feet, and will install at first 40 knitting machines for a daily output of 200 dozen pairs of men's fine gauze half-hose in the grap. Operations will be begun this month.

CHARLOTTE: Sumner B. Sargeant, of this place, is interested in the organization of a cotton mill company with capital of $100,000 for the manufacture of cotton yarn.

CONCORD: The Hanover Manufacturing Company has been incorporated with a capital of $150,000 for the manufacture of cotton goods. Lewis W. Brander is one of the incorporators.

CONCORD: The Franklin Cotton Mill is contemplating the doubling of its present plant of 7,000 spindles.

CUMBERLAND: The J. F. Houston Company is erecting an additional mill building of reinforced concrete, 71 by 371 feet with basement. When completed the building will be equipped with 5,000 spindles and accompanying machinery for the production of cotton yarns.

DENTON: Berry Davidson, of Gibsonville, with others are interested in the Denton Cotton Mills Company recently incorporated with a capital of $100,000, for the erection of a 5,000 spindle cotton yarn mill.

HIGH POINT: The High Point Hosiery Mills are to build another mill for the production of misses' ribbed hose to be dyed and finished at the mills.

KINSTON: The Caswell Cotton Mills, recently incorporated, with a capital of $200,000, will soon erect a building and equip it with machinery. J. E. Hood is interested.

TROY: S. J. Smitherman and others are interested in a proposition to erect a cotton yarn mill at this place to cost $200,000.

WHITNEY: A large cotton mill is in contemplation for this place in which capitalists of North Carolina and Pennsylvania will be interested. Electricity will be used for the motive power, obtained from the Whitney Company, which expects to be furnishing 40,000 horsepower next year.

WILSON: The Wilson Grocery Company is interested in a scheme for the manufacture of cotton wadding for which linters will be used. The necessary machinery has not yet been obtained.

WILSON: B. B. Boykin and associates contemplate organizing a company with capital of $250,000 for building a cotton mill at this place.

OKLAHOMA.

CLEVELAND: The Cleveland Hosiery Mills have been incorporated with a capital of $75,000. Charles E. Brown of Oklahoma City is one of the incorporators.

PENNSYLVANIA.

HARRISBURG: The Hyde Park Knitting Mills have been incorporated to manufacture hosiery and knit goods with a capital of $15,000. R. S. B. Light of Reading is one of the incorporators.

SOUTH CAROLINA.

ANDERSON: The Conneross Yarn Mill has been incorporated for the purpose of operating the plant of this name recently purchased by A. S. Farmer.

BLACKSBURG: The Blacksburg Mills have been organized for building a cotton factory. G. Lang Anderson is one of the organizers.

BLACKSBURG: It is said that the Whittaker Cotton Mills are to double their present equipment of 5,000 spindles.

CHERAW: The Cheraw Cotton Mills have been incorporated for the purpose of building a plant of 10,000 spindles and 300 looms for the manufacture of cotton cloth. It is expected that the Rockingham Power Company will furnish the electric motive power. If this is not done the mills will use steam power.

CROSS HILL: P. S. Bailey & Son of Clinton have purchased and will operate the Cross Hill Oil & Hosiery Mills at this place.

GAFFNEY: The Gaffney Manufacturing Company intend to equip another large mill, and is now remodeling a building that has been used for finishing cotton goods for an installation of machinery for making cloth, and expect to equip it with 20,000 to 30,000 spindles.

NEWBERRY: Edward R. Hipp has purchased one hundred acres of land as a site for a cotton mill which will be incorporated.

NEWBERRY: The Highland Cotton Mills have been incorporated with capital of $300,000, to erect a cotton factory near this place. F. N. Martin is one of the incorporators.

ROCK HILL: The Harriss Manufacturing Company is said to have plans for the erection of a 75 by 300-foot building for the manufacture of cotton yarn and cotton pads.

Continued on page 68

Cassella Color Company

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PHILADELPHIA
PROVIDENCE
ATLANTA
MONTREAL

Kalle & Co.

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Manufacturers

Aniline Colors

of every description

Latest Novelty

THIO INDIGO B PASTE

(Patented)

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Sail regularly every WEDNESDAY at 2 p. m., from **Baltimore to Bremen.**
Second Cabin Passage, $45.00 and upwards.
Freight at lowest current rates to Bremen, Hamburg, to all ports in the Baltic and Mediterranean, in India, Australia, New Zealand, China, Japan, etc. Ask your railway agent for through freight rates.
A. SCHUMACHER & CO., Gen'l Agents, 7 South Gay Street, BALTIMORE, MD.

Continued from page 66

UNION: The Mishna Cotton Mills of this place have been organized for the building of a cotton mill of 15,000 spindles and 450 looms for the manufacture of fancy cottons and lawns to give employment to about 350 operatives. Electricity will be employed for transmission of power, by the Southern Power Company of Charlotte. N. C.

TENNESSEE.

BRISTOL: The Board of Trade of this place has made arrangements for the organization of a company for the manufacture of hosiery, in which Philadelphia parties will be interested.

MORRISTOWN: A company is being organized here with a capital of $150,000 to build a mill of 9,000 spindles and 200 looms. H. C. Gildard, Knoxville, Tenn., can furnish information.

TEXAS.

BEAUMONT: The Textile School of the Agricultural and Mechanical College of this place has purchased $1,500 worth of new machinery, including that used for the making of fine yarns, which are not at present manufactured in this section. This is regarded as a valuable addition to the state's cotton industry, as many Texan plants are already engaged in the finer lines of work.

MEXIA: W. L. Murphy, Vice-President of the First National Bank, is in correspondence with eastern capitalists for the establishment of a cotton mill in this place.

SHERMAN: The Sherman Oil Mills Company is negotiating with eastern capitalists relative to the building of a cotton mill in this place, with a capital of $500,000.

SHERMAN: L. G. Finch of this place has a proposition for the establishment of a mill which will take the cotton in the seed, gin it, spin it, weave and knit it, bleach it and manufacture it into garments to be sold direct from the mill to the consumer.

CANADA.

TORONTO: The Waterloo Knitting Company, Carlton Place, has been incorporated with capital of $250,000.

AMONG SUPERINTENDENTS, OVERSEERS AND OTHERS.

We shall be pleased to receive notices of any changes among agents, superintendents, and overseers in textile mills.

J. K. McMahan is now overseer of carding at the Winder Cotton Mills, Winder, Ga.

J. D. Galloway has been promoted to overseer of weaving for the Mollohon Manufacturing Co., Newberry, S. C.

J. D. Strange has accepted the position of overseer of the cloth room of the Aragon Cotton Mills, Rock Hill, S. C.

W. M. Howard is now general manager, as well as vice-president, of the Aldora Mill, Barnesville, Ga.

L. R. Hagood has assumed the management of the mills of the Lula Manufacturing Co., Kings Mountain, N. C.

W. D. Kirby has been promoted to the position of overseer of carding in the Cox Manufacturing Company's Mill No. 2, Anderson, S. C.

D. H. Hoffman has accepted the position of overseer of carding for Mill No. 1, of the Manetta Mills, Lando, S. C.

W. R. Reynolds is now overseer of spinning at the Manetta Mills, Lando, S. C.

C. H. May has been chosen superintendent of the Spencer Mountain Cotton Mill, Lowell, N. C.

R. H. Hughes is now overseer of carding in No. 1 Mill of the Cox Manufacturing Co., Anderson, S. C.

J. M. Smith has taken the position of overseer of twisting in Mill No. 1, of the Manetta Mills, Lando, S. C.

J. S. Lamb is now overseer of weaving at the Avondale Mills, Birmingham, Ala.

J. R. Young has been elected superintendent for the Levi Cotton Mill Co., Rutherford, N. C.

G. M. Tritt is now overseer of spinning at one of the Schoolfield Mills, Danville, Va.

B. F. Gardner is now in charge of the spinning for the Gibson Manufacturing Co., Concord, N. C.

Samuel Murphy has now taken charge of the cloth room for the Glenn-Lowry Manufacturing Company, Whitemires, S. C.

J. B. Boyd has been chosen superintendent of the Clinton Cotton Mills, Clinton, S. C.

C. B. Adams is now in the weave room at the Glenn-Lowry Manufacturing Company's mill at Whitemires, S. C.

C. E. Davis is now overseer of spinning and spooling in the new cotton mill at Kansas City, Mo.

D. E. Methot has taken the position as overseer of the twisting department of the Grant Yarn Co., Fitchburg.

Arthur Smalley has accepted a position at the Barnaby Manufacturing Company's mill, Fall River, Mass., as head designer.

Nelson H. Marsden is now superintendent of the Utica Cotton Company's mill at Capron, N. Y.

J. T. Tidwell is now overseer of weaving in the Drayton Mills, Spartanburg, S. C.

H. M. Smith has become overseer of carding and spinning at the Arcadia Mills, Spartanburg, S. C.

J. R. Lee has been promoted to the position of overseer of carding in the Jackson Mills, Iva, S. C.

J. E. Shaw has been elected superintendent of the Anderson Cotton Mill No. 2, Anderson, S. C.

Edward T. Brown has taken the position as overseer of carding at Mill No. 1, of the Clifton Manufacturing Company, Clifton, S. C.

Thomas M. Hurt is now overseer of weaving in the Granby Cotton Mills, Columbia, S. C.

David Waug has taken the position of boss carder at Gilmanton Mills, Belmont, N. H.

James Andrews has gone to the Dwight Manufacturing Company, Chicopee, Mass., as overseer of ring spinning.

D. E. C. Clough has, with his other duties, taken charge of the carding for the Fidelity Manufacturing Co., Charlotte, N. C.

W. A. Duke has gone to Mayesworth, N. C., to take charge of the carding in the new mill at this place.

T. T. Gray is now overseer of carding at the Alexander City Cotton Mills, Alexander City, Ala.

H. C. Dresser has taken the superintendency of the Maginnis Cotton Mills, New Orleans, La.

J. M. Short is now overseer of carding and spinning in Mills No. 2 of the Gaston Manufacturing Co., Cherryville, N. C.

A. L. Ellis is now overseer of spinning at the Jackson Mills, Iva., S. C.

T. N. Crocker has taken charge of the carding for the Bibb Manufacturing Company, Porterdale, Ga.

T. M. Crowell has taken charge as superintendent and manager of the Paola Mill, Statesville, N. C.

Will Sykes is now overseer of weaving in the Peoples Cotton Factory, Montgomery, Ala.

J. P. Carter is now with the Woodside Cotton Mills, Greenville, S. C., as overseer of spooling, warping and slashing.

C. H. Goodroe has been elected general manager of the Gate City Cotton Mill, Atlanta, Ga.

C. A. Sparks has taken the position as overseer of spinning in the new Merrimack Mills, Gaffney, S. C.

The cotton fiber, being a seed-hair, has only one end naturally closed, the other being broken off at the point of attachment.

Both the cuticle and protoplasmic layer of the cotton fiber resist the severe alkaline treatments of the industrial bleaching process.